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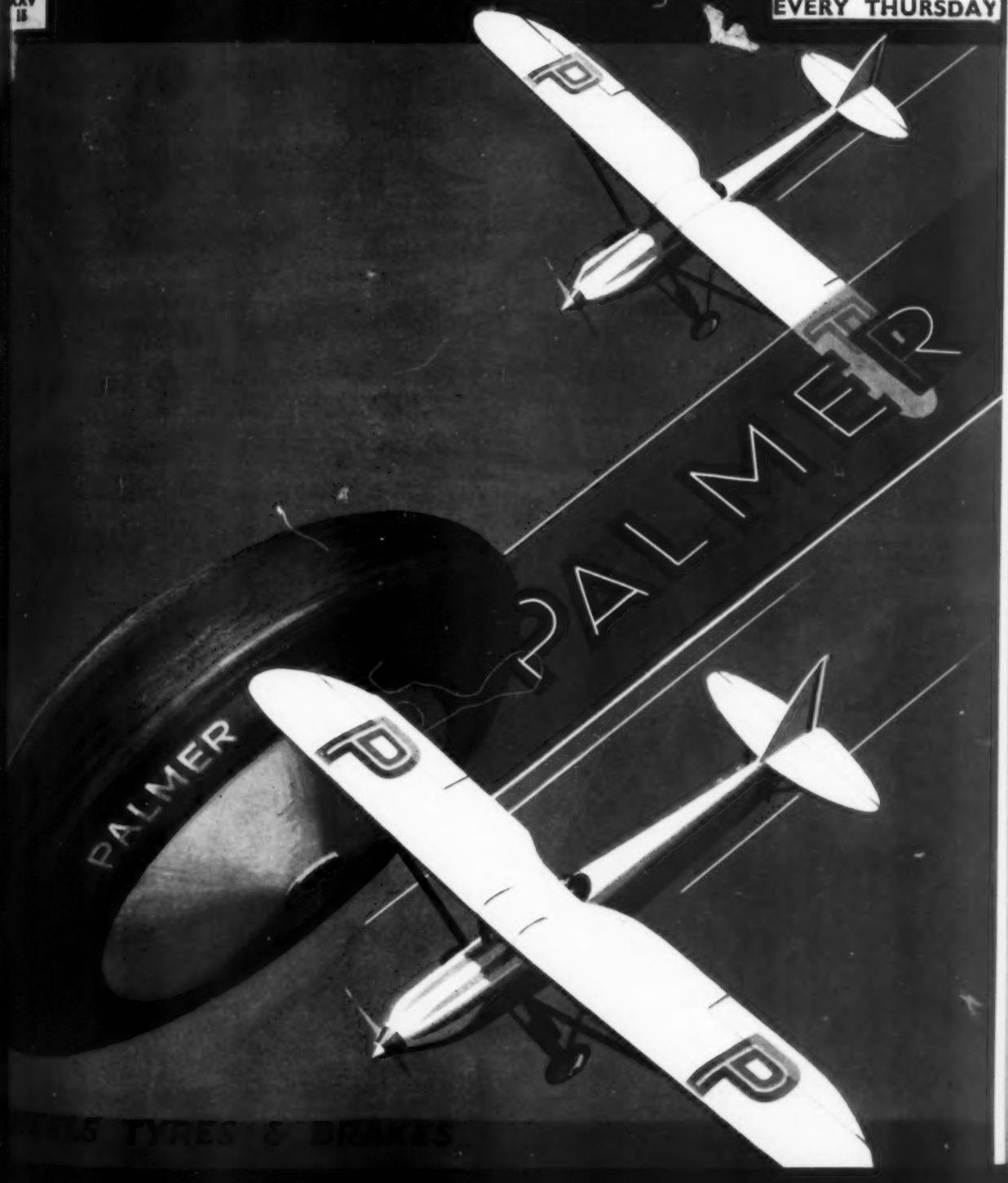


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# FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

**First Aeronautical Weekly in the World. Founded January, 1909**

**Founder and Editor: STANLEY SPOONER**

**A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport**

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**DIARY OF CURRENT AND FORTHCOMING EVENTS**

*Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—*

**1933.**

**Apr. 16.** National Aviation Day Display at Gravesend Aerodrome.
**Apr. 17.** National Aviation Day Display at Maidstone Airport.
**Apr. 27.** "Seaplane Research," Lecture by H. M. Garner before R.Ae.S.
**Apr. 28.** Junior Ae.C. Dinner to Sqd. Ldr. Gayford and Flt.-Lt. Nicholetts.
**Apr. 28.** A.I.D. Technical Staff Association Annual Dinner, Holborn Restaurant.
**Apr. 29.** No. 34 Sqdn. Reunion Dinner, Ship Restaurant, Whitehall.
**May 1.** Entries close at ordinary fee for King's Cup Race.
**May 5.** Oxford University Air Sqdn. Dinner, Clarendon Hotel, Oxford.
**May 5.** Opening of Inverness Municipal Airport.
**May 16-22.** International Rally, Vienna.
**May 19.** Entries close at double fee for King's Cup Race.
**May 20.** G.A.P.A.N. Annual Civil Air Display, Brooklands.
**May 20.** Opening of R.A.F. Rifle Association's Meeting at Bisley.
**May 25.** Tourist Rally at Wiesbaden.
**May 27.** Reading Ae.C. Annual "At Home."
**May 28.** Deutsch de la Meurthe Cup, Etampes.
**May 30.** Wilbur Wright Memorial Lecture before R.Ae.S.
**June 5.** "Morning Post" Race, Heston.
**June 5.** Lincs. Ae.C. Air Pageant and Opening of Aerodrome at Holton-le-Clay, Grimsby.
**June 5.** Skegness Flying Meeting.
**June 5.** Northamptonshire Ae.C. Annual Air Pageant.
**June 7.** Household Brigade Flying Club Meeting.
**June 10.** Henly's Rally, Heston.
**June 11.** International Meeting, Brussels.
**June 15-18.** Aero Club of France Tourist 'Plane Meeting.
**June 16.** Mayor's Aerial Garden Party, Eastbourne.
**June 17.** Bristol Airport Flying Meeting.
**June 17.** Charity Air Display at Maidstone Airport.
**June 21.** Official Opening of Norwich Municipal Airport by H.R.H. the Prince of Wales.
**June 24.** Royal Air Force Display, Hendon.
**July 1.** Merseyside Aviation Display and Opening of Speke Aerodrome, Liverpool.
**July 8.** King's Cup Air Race, Hatfield.

# EDITORIAL COMMENT

TO-DAY, April 13, twenty-one years ago, H.M. the King signed the Royal Warrant which brought into being the Royal Flying Corps, with Naval and Military Wings. It was an event of first-class importance, not only in the history of the United Kingdom, but in the history of arms and warfare. The aeroplane was first used for fighting purposes, if we remember right, in Mexico in 1910, and aeroplanes, kite balloons, and airships were all used by the Italians in their campaign in Tripoli in 1911. The formation of the Royal Flying Corps was an event surpassing in importance all that had been done by foreign nations to give aircraft an acknowledged place in their fighting forces, because it made provision for use by both Navy and Army in the one Royal Warrant, and so contained the germ of the separate Air Force which has since come into being.

**Twenty-one Years Ago**

For the time the conception of one air service failed to materialise. As is pointed out in the special article on the subject which we publish on another page, the Admiralty disliked the arrangement, and contrived to dissociate the Naval Wing from the Royal Flying Corps and to convert it into the Royal Naval Air Service. By doing so, the Admiralty apparently defeated their own object, because the division of effort did not work well in war, and, as a result, a far more complete fusion of naval and military air services than had been provided in the Royal Warrant of 1912 was ultimately brought about. A loyal adherence to the terms of the Royal Warrant might well have left the Royal Flying Corps firmly established. In that case there would have been no Royal Air Force, and so perhaps all happened for the best in the long run.

In 1916 FLIGHT began to agitate for the formation of a separate air service, and for two years cried almost alone in the wilderness, culminating, on July 5, 1917, in the slogan "One Air Service, One Uniform, One Badge," which moved many to help forward the ultimate result of the one Service. Many who vehemently opposed us then are now enthusiastic converts to the idea of a separate Air

Ministry and separate Air Force. The Royal Air Force, in fact, stands for much more than the original Royal Flying Corps represented. That body was concerned only with supplying air arms to the two existing Services. The Royal Air Force does that too, but this supply work is not its most important function. The Royal Air Force is capable (or would be, if its numbers were suitably increased) of waging an air campaign in which the other Services might not take part. It has done so in tropical countries, and has achieved rapid success. It can and does control various Eastern lands with a great saving in cost to the taxpayer. It can speedily reinforce one country of the Empire from another. Above all, it undertakes the air defence of Great Britain, a task of such supreme importance and complexity that it would be the height of folly to hand it over to be run as a side-show by either the Admiralty or the War Office. Such things were not thought of when the Royal Flying Corps came into being; but its founders evidently saw that they were dealing with the beginnings of great things. The germ of the matter was in them. It would be ungracious to let the 21st anniversary of this great birthday pass without sparing a grateful thought for the men who planned so wisely and so well.

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**Lessons of the Do.X**

Some years ago, in his series of articles in THE AIRCRAFT ENGINEER (monthly technical supplement to FLIGHT), Mr. J. D. North pointed out that if there are ten contributors to the common stock of knowledge, each contributor stands to receive nine times as much as he gives, on the average. Mr. North contributed his fair share of knowledge to our pages, but it is possible to argue that the other nine did not, during subsequent weeks, add their quota. So far the aircraft designer who has followed most closely Mr. North's precept is Dr. Dornier, who as long ago as 1928 told the Royal Aeronautical Society a very great deal about his flying boats, and even about the, at that time, un-built Do.X. In his paper, read, in his unavoidable absence, before the Society last Thursday by one of his technical assistants, Dr. Dornier placed the British aviation community further in his debt by giving very full data indeed of the Do X as actually built and flown. Where failures had been experienced, and room found for improvement, Dr. Dornier's paper admitted the fact frankly. For the successes attained, and they are not small, the distinguished designer made but very modest claims, and one cannot help feeling that, if one may be permitted such an expression, Dr. Dornier's whole outlook on aircraft design is very British. It was with very sincere regret that the audience heard from Mr. Fairey of Dr. Dornier's inability to be present to read the paper and reply to the discussion in person.

In this week's issue we publish the first part of Dr. Dornier's paper, as we feel certain our readers will wish to read it *in extenso*, and it was, unfortunately, impossible, due to our long article on the early days of the Royal Flying Corps, to publish it in full this week.

We believe we are correct in saying that Dr. Dornier's paper mentioned for the first time the difficulty in cooling the rear engines in the six tandem pairs. "Serious trouble had developed through the insufficient and irregular cylinder cooling of the aft engines." The general impression in this country has been that no serious cooling troubles were encountered. In view of the fact that the Bristol company has now carried out its Air Ministry 100 hours' type tests with a "Pegasus" as a pusher, and that very much better air-cooled engines are now available than those used in the Do.X 1, it would be interesting to have Dr. Dornier's views on the subject of air-cooled engines in a future Dornier "flying ship." The relatively low cruising horse-power of the early engines was another reason given for going over to the water-cooled type of engines.

British flying-boat designers will undoubtedly be interested in Dr. Dornier's championship of the sponsons in preference to outboard wing floats. That they do provide a very convenient platform for embarking and disembarking passengers cannot be denied, and, as pointed out in the paper, it was even found possible to take people on board from a motor boat while the Do.X was taxying at fairly high speed. But we believe that British designers will, on the whole, prefer to use wing floats. This subject must of necessity be bound up with the placing of the fuel. We did away with petrol in the hull a great many years ago, and shall not lightly be persuaded to put it back there. While we carry engines in, on or between the wings, and petrol inside the wing, the high c.g. position resulting would probably render the use of sponsons unsatisfactory, since an outboard wing float continues to give increased buoyancy until it is quite submerged, while with sponsons little or no extra buoyancy is available once the tip is submerged. A small angle of heel after that may then be sufficient to cause instability. It was, we believe, Mr. Arthur Gouge who said some years ago that if a flying boat of normal British design reached a certain size, it would be self-stable, as the c.g. height did not increase proportionately with size. Perhaps we may in time see the flying boat without either sponsons or wing floats.

The figures of gross and tare weight given by Dr. Dornier in his paper were extremely interesting. At a gross weight of 56 metric tons (123,300 lb.) the Do.X carried as disposable load 44·3 per cent. of its gross weight, or, as we in FLIGHT prefer to express it, the ratio of gross to tare weight was 1·795, so that the machine carried as disposable load 79·5 per cent. of its tare weight. This was the greatest weight at which the machine got off, and evidently is regarded as an overload.

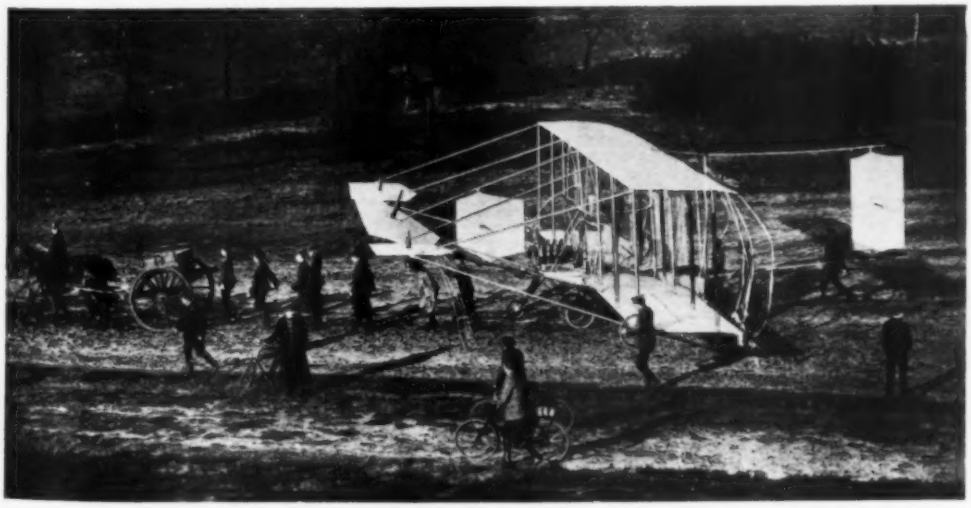
At the normal gross weight of 48·7 metric tons (107,300 lb.) the ratio of gross to tare weight is 1·56. Average figures for British machines indicate that 55-65 per cent. of the tare weight is about the usual disposable load, so that at this gross weight the Do.X is approximately level with British machines in what may be termed structural efficiency. At the gross weight of 56 tons the wing loading is 24·6 lb./sq. ft., which is about that of our Schneider Trophy seaplanes! Even at 48·7 tons the wing loading is 20·5 lb./sq. ft. This is a good deal higher than used in British flying boats, and can, we think, fairly be said to be the price Dr. Dornier has had to pay for *size*. Obviously, if he had to increase the wing area of the Do.X to get a wing loading comparable with ours, the structure weight would go up, and the disposable load would become a smaller percentage.

# COMING OF AGE OF OUR AIR SERVICE

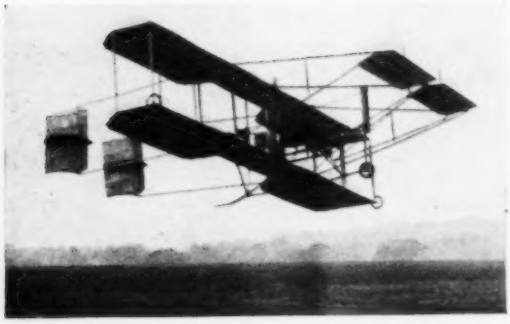
*In the following article many officers are mentioned who now hold high rank and titles. They are spoken of by the ranks which they held at the time when the Royal Flying Corps came into being. Most of them are so well known that our readers will know the present ranks and titles for themselves*

TWENTY-ONE years ago, on April 13, 1912, the King signed a Royal Warrant which brought into being the Royal Flying Corps with its Naval and Military Wings. It was a corps which was never destined to come of age. It passed away when within a few days of its sixth birthday, and the Royal Air Force reigned in its stead. On the whole, it died unregretted, though certainly not "unwept, unhonoured, and unsung." Of honour it had won enough and to spare, and the tears and the songs may be taken "as read." The Naval Wing had become transformed (without Royal Warrant) into the Royal Naval Air Service, and the flying naval men on the whole did not welcome the change of April 1, 1918, so enthusiastically as did the Army men. But the R.N.A.S., though it was the successor of the Naval Wing, had become something different and could no longer be thought of as part and parcel of the Royal Flying Corps. The R.F.C. in 1918 was purely military, and its members welcomed the change to a new and entirely separate fighting Service as an improvement on the old state of affairs.

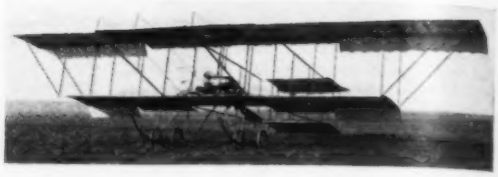
Perhaps it is true that in the Army loyalty to the corps comes before loyalty to the Service, and every soldier hankers for something which will mark him as different from his fellows, some new uniform or some new badge on the common uniform. Membership of a new Service appealed to that instinct in the soldier. The Navy is a more homogeneous Service. There is no permanent division into ships, and the name of the ship round the cap of the seaman is only a temporary affair which commands no loyalty such as is paid to the uniform of the Service. The naval flying men had imbibed much of this spirit, and they



**THE BRITISH ARMY BIPLANE, 1909 VERSION: Mr. Cody's machine being wheeled out on to Laffan's Plain for a flight.**



**WINNER OF MILITARY TRIALS IN 1912: Cody's machine in flight.** (FLIGHT *Photo.*)



**AN EARLY IDEA OF A MILITARY AEROPLANE: The Bristol "Box Kite" was rather similar to the Henry Farmans of the period, but differed from them in several details. The engine fitted was a Gnome 7-cylinder rotary air cooled, driving a pusher airscrew. Pilot and passenger were unprotected from the wind.**

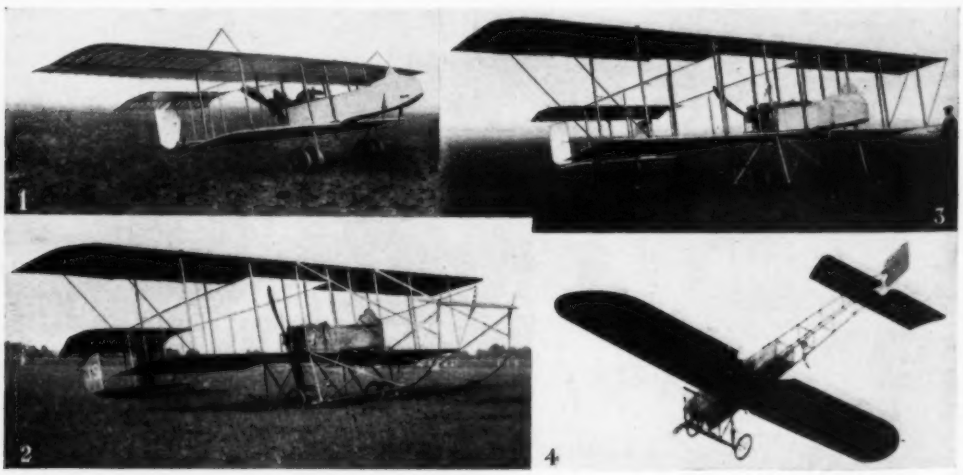
were not pleased when they ceased to belong to the Royal Navy. Lieutenants who suddenly found themselves dubbed "Captain" were mollified, for to the naval mind the rank of captain is full of dignity. Otherwise the R.N.A.S. accepted the change with philosophical resignation. "C'est la guerre!"

It may be asked, therefore, why the date on which the R.F.C. came into official being should be celebrated 21 years after, when the Corps itself had such a brief, albeit stirring, existence. The reason is that the signing of that Royal Warrant on April 13, 1912, marked a turning point in the history of the power of Great Britain. It was a formal recognition of the possibilities of air power. It was evidence of the conversion of the official mind from credulity to faith. It put a seal on the work of the pioneers of the air. It showed that the Cabinet of the day had reached a conviction that aircraft were not merely scientific toys, but were at least potential weapons of war. The rulers had at last realised that air reconnaissance might become of great importance to an army or a fleet, and that it would not be wise for Great Britain any longer to lag far behind France and Germany in providing an air arm for the Royal Navy and for the Army. From that one critical decision all else has naturally been evolved. The change from the Royal Flying Corps to the Royal Air Force was not, in fact, so great and epoch-making as that from the Air Battalion of the Royal Engineers to the Royal Flying Corps.

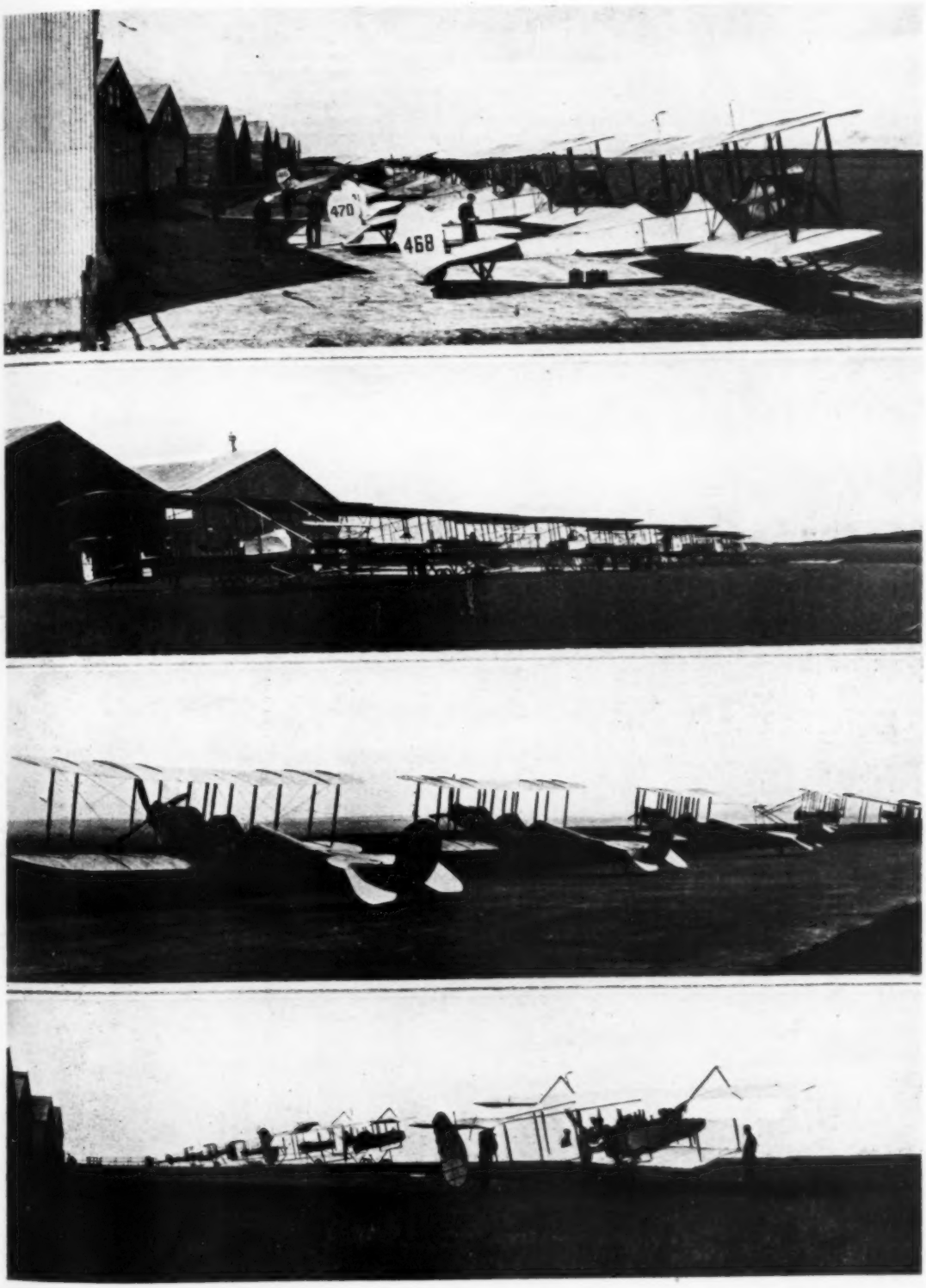
**FIRST COMMANDER OF THE R.F.C. IN THE FIELD: An early photograph of Brig. Gen. David Henderson, who took the R.F.C. to France in 1914.**

It might be held by some that the really important step was the formation of the Air Battalion. It was important, without doubt. It did give official recognition to aircraft. But for one thing, this battalion took no count of the Navy. That in itself shows that as a development it was far less important than the formation of the Royal Flying Corps. The Air Battalion proved only the partial conversion of one of the Services, and did not commit the Government of the country. It was constituted by an Army Order dated February 28, 1911, only little more than a year before the Royal Flying Corps was brought into being by a Royal Warrant. The Air Battalion was only a stepping stone; certainly an important stepping stone, but it did not build an imposing structure such as the Royal Warrant of 1912 built—a structure which might be modified in form but which had permanent foundations. A subdivision of the Corps of Royal Engineers was a very much less matter than a Corps which provided Wings for both Navy and Army.

So far as we know, the Royal Flying Corps in its original state was a unique conception in the history of British arms. Never before, we




**THE BEGINNINGS OF MILITARY AIRCRAFT: 1, the Henry Farman (Gnome rotary engine); 2, Maurice Farman "Longhorn" (Renault vee air cooled); 3, Maurice Farman "Shorthorn," in which the front elevator had disappeared; 4, Blériot monoplane (50-h.p. Gnome).**



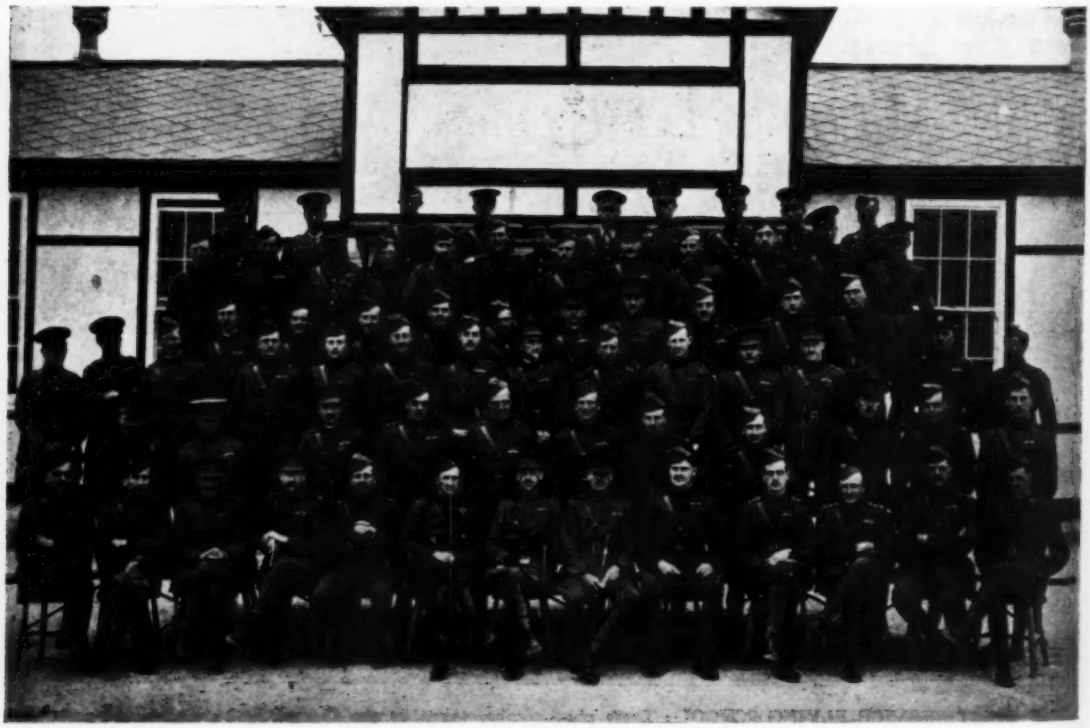

**THE FIRST SERVICE FLYING SCHOOL : These photographs, taken at the Central Flying School, Upavon, in 1914, show, from top to bottom : B.E. biplanes of "A" flight ; Maurice Farmans of " B " flight ; B.E's. and M. Farmans of " C " flight, and some Henry Farmans of " D " flight.** (FLIGHT *Photos.*)

**THE FIRST C.O. OF R.F.C. MILITARY WING: Maj. F. Sykes.** (FLIGHT *Photo.*)

believe, had one corps been instituted to provide for the needs of both Navy and Army. There are many lethal weapons which are common to the two Services. Both need or have needed big guns, machine guns, rifles, bayonets, and swords, but never before has one organisation been set up to supply the needs of both. There was a time when the Admiralty used to borrow battalions of infantry and embark them on the warships, but after a time the Admiralty preferred to raise their own Marines, both infantry and artillery. There never was an organisation of artillery with naval and military subdivisions. It was this which made the Royal Flying Corps unique, and it was perhaps this feature which doomed that corps to a short life. The centrifugal tendencies were too strong. One feature of the original organisation was, however, undoubtedly sound. One flying school was provided for both Services. It was then called the Central Flying School. There is a Central Flying School still, and it has had a continuous existence from 1912 to the present day. But its functions now are different to what they were then. Now it trains flying instructors how to teach new pupils how to fly. In 1912 it gave a finishing course to officers who had learnt to fly at civilian schools. When, soon after the outbreak of war, the civilian flying schools mostly disappeared, the Central Flying School undertook *ab initio* training of pilots for both the Services. It is certainly a right and economical conception that elementary flying should be taught to the men of all Services at one school. Specialist courses can be taken afterwards at schools which specialise in naval work, army work, or work which is peculiar to the Air Force as apart from either of the older Services. It should not be forgotten that the first commandant of the Central Flying School at Upavon was Capt. (afterwards Rear-Admiral) Godfrey Paine, R.N. His second in command (and this is also significant of the importance of the school) was Maj. Hugh Trenchard, of the Royal Scots Fusiliers.

**FIRST ADJUTANT R.F.C. MILITARY WING: Lt. B. H. Barrington-Kennett.** (FLIGHT *Photo.*)

The Royal Flying Corps might have remained what it was at its foundation had it not been for the distaste of the Admiralty and the Navy for any form of sharing an organisation with the Army. There does not seem at first sight anything very derogatory to the dignity, or any interference with the duties and responsibilities, of the Navy in the conception



**OFFICERS OF THE R.F.C. AT CONCENTRATION CAMP, NETHERAVON, 1914: In this group may be found many whose names later became famous. In the centre of the front row is Col. F. Sykes and, on his right, Maj. Higgins.**

A STAFF OFFICER OF THE R.F.C. : Maj. W. S. Brancker. (FLIGHT *Photo.*)

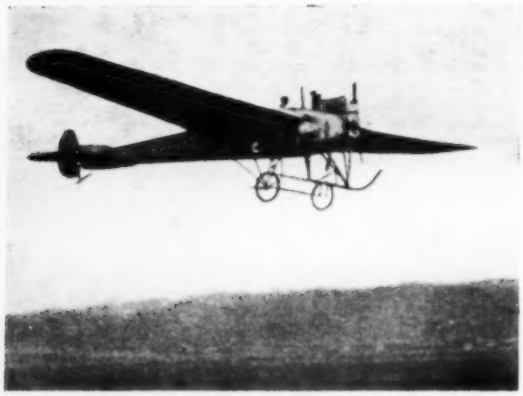
and organisation of the Royal Flying Corps. Once officers had passed through the Central Flying School, each belonged entirely to his own Service. There was then nothing like the situation which afterwards arose in 1919, when a separate Service supplied aircraft and personnel to embark on naval ships, and transferred the personnel at its own good pleasure. No one can be surprised at the objections raised to that arrangement by the Admiralty, most of which objections were upheld and rectified by the Balfour Commission. In 1912 the attitude of the Admiralty seemed rather of a petti-fogging nature, all the more so because they could not very well be openly expressed in view of the Royal Warrant. Tacitly, however, the Admiralty began to drop the phrase Royal Flying Corps (Naval Wing) and to speak of the Royal Naval Air Service. By degrees the new title came to receive official recognition. "What's in a name?" As a general rule the compromise - loving British people care very little, outside the law courts, about correct nomenclature. The majority of the people, even R.A.F. Officers, still persist in calling the Hendon Display the "Pageant," because they got accustomed to that word, although it is both officially and in reality incorrect. The majority of people, including even some Air Ministry officials and also the Secretary of State for Air when he presents the Air Estimates, continue to talk as if "aeroplane" and "seaplane" were opposite terms, and decline to believe that a seaplane is an aeroplane, which of course it is, officially and actually. "What does it matter what I say, so long as you know what I mean?" is the usual British attitude. The Admiralty, however, by contriving to change the name, succeeded in separating the R.N.A.S. completely from the R.F.C., and by so doing brought about the extinction of both, and forced the country to found the Royal Air Force. During the early days of the war naval officers still went to Upavon to learn to fly, but the Central Flying School was so overworked by the tremendous demands made upon it by the Army for pilots for France, that when the Admiralty set up its own training organisation only relief was felt, and no objections were raised. This cut the last strand of the frail painter which joined the two Air Services together, but the real severance began when the Admiralty changed the name of its flying arm. So perhaps there is something in a name after all.

The winning of the recognition expressed by the Royal Warrant had meant a very great deal of work by the early pioneers of the air. The struggle started with an attempt to persuade the War Office to adopt the captive balloon as a regular means of reconnaissance. One must always bear in mind that the original and primary function of aircraft is reconnaissance—that is to say, seeing. Air bombing, so as to supplement the range of the artillery, was a much later conception, and so, naturally, was air fighting with the object of destroying the enemy's observation aircraft and preventing him from destroying one's own. The quality of aircraft which first recommended it to the fighting Services was not speed but height. To get up high and have a wide and long view was the great need of the staff officer. It was all very well to send out infantry scouts and cavalry pickets. Sooner or later they would make contact with the enemy scouts or pickets, but rarely could they see what lay behind that screen. Generals groped for each other in what was known as the "fog of war." Many a staff officer must have echoed the Psalmist's cry "Oh for the wings of a dove!"

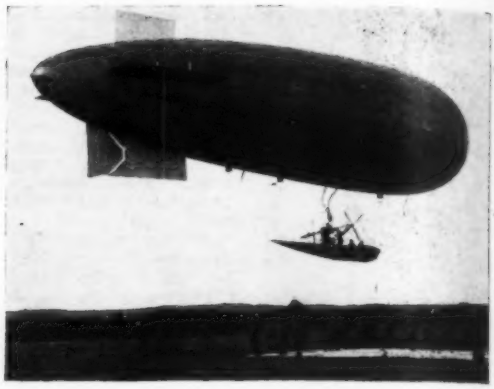
That being so, the advent of the balloon ought to have been welcomed by all thinking soldiers as a gift from Mars. As a matter of fact, it was welcomed only by a few enthusiasts. It is fashionable and easy to say that the majority of professional soldiers are unduly conservative and unreceptive of new ideas. Some undoubtedly are so.

A SUBALTERN, R.F.C. : 2nd Lt. O'Brien Hubbard. (FLIGHT *Photo.*)

THE 1914 STAFF OF THE CENTRAL FLYING SCHOOL, UPAVON : In the front row may be seen the Commandant, Capt. Godfrey Paine, C.B., M.V.O., R.N., and Maj. H. M. Trenchard, C.B., D.S.O., Assistant Commandant. (FLIGHT *Photo.*)



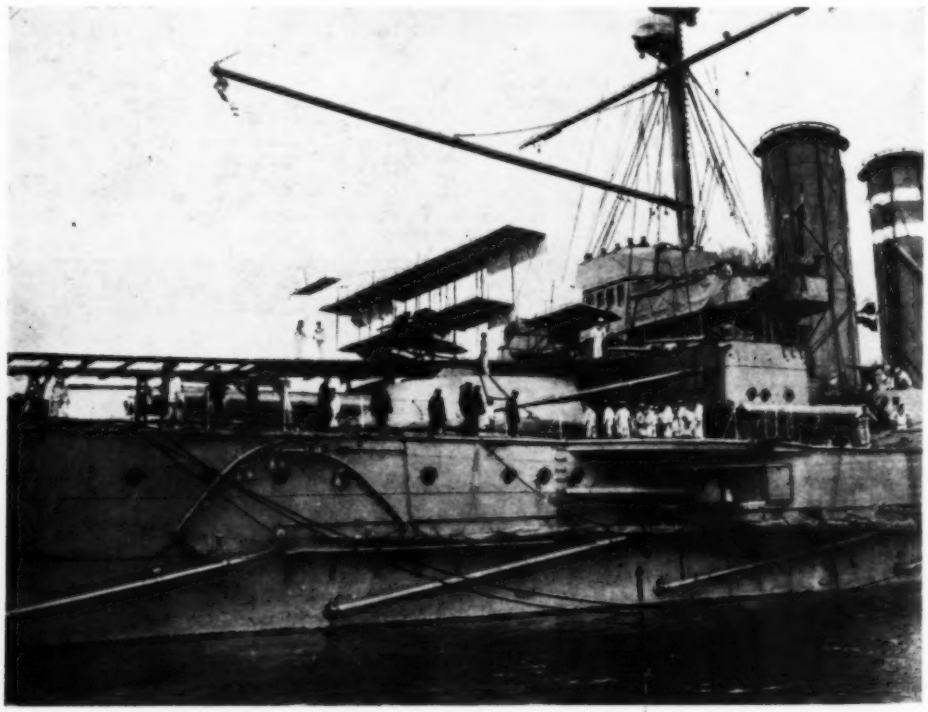
**A 1912 MONOPLANE (GREEN WATER-COOLED ENGINE) : Mr. Howard Flanders was rather ahead of his time in design.** (FLIGHT *Photo.*)



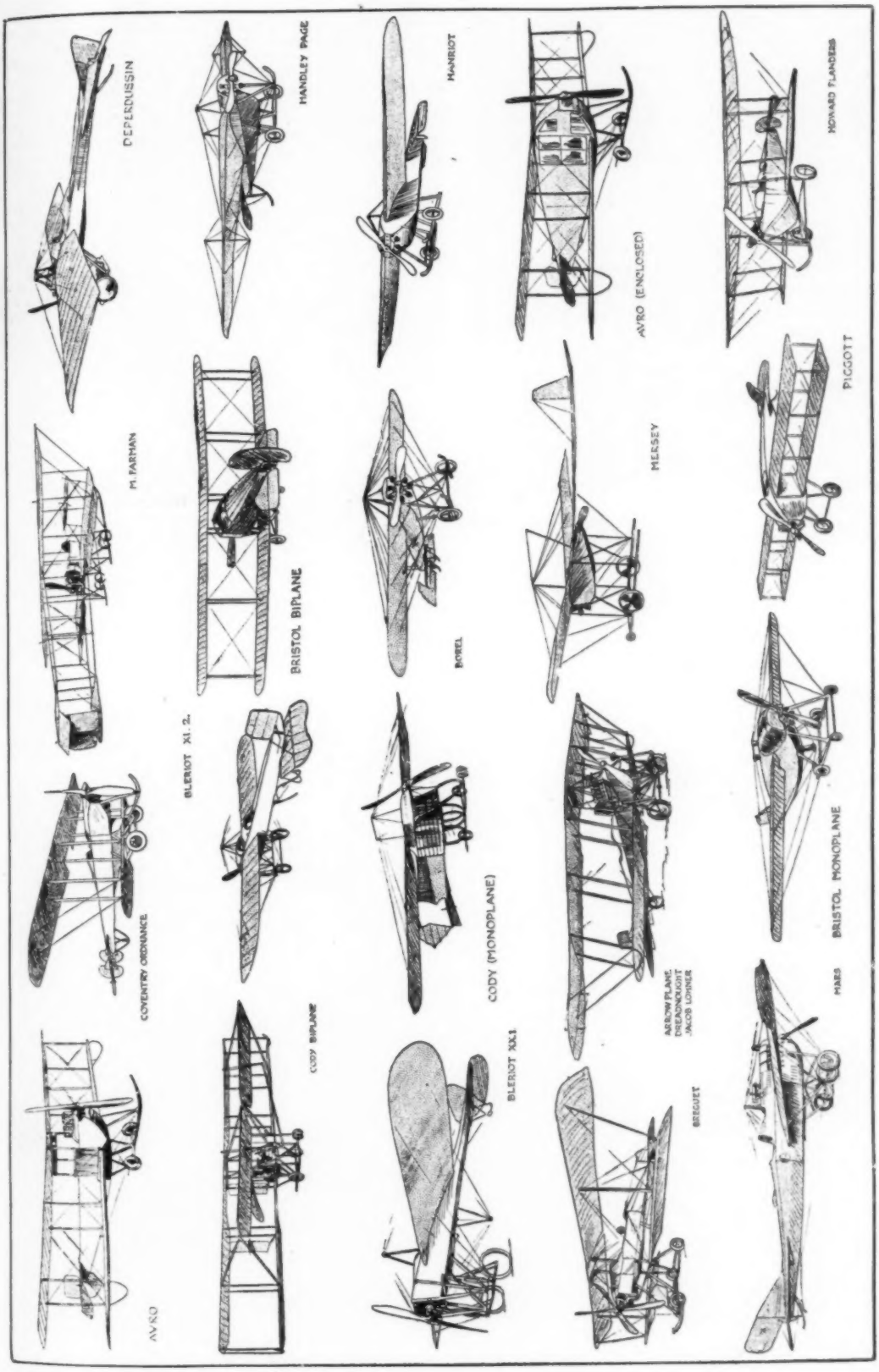
**EARLY LIGHTER THAN AIR : The military airship *Beta* was made by enlarging the *Baby*.**

but it would not be just or true to stigmatise the whole Army as incapable of progressive thought. One must remember that the Army authorities are constantly dealing with a succession of crazy inventors who request to be paid large sums for some device which will give a short cut to victory by utterly destroying the enemy or by making one's own troops invulnerable. The percentage of such inventions which are of any value at all must be very small indeed. The Army authorities are always cautious in dealing with these inventions. The inventor who has got a sound idea but has embodied it in a crude home-made sample looks ahead and sees the glowing possibilities of the future. The War Office cautiously ask what value the device will be to the Army now. More often than not the invention in its crude elementary stage would be unworkable in the field, and the War Office, never very flush with public funds, either bid the inventor go and develop it at his own leisure and expense, or else devote a small sum of money to a limited experiment. Sometimes this caution delays a development which, if it had been hastened, would have saved lives of soldiers in the next campaign and would have brought speedier victory ; but more often it prevents a squandering of the taxpayer's hard-earned money.

On the whole, the Army may be said to have given as much encouragement to the development of military aircraft as could reasonably have been expected. One mistake made by the Army was in not trying out the possibilities of balloons very thoroughly on manœuvres. They were first given a thorough trial on active service, and then the teething troubles developed when there was no time and no facilities for overcoming them. Then it was found that though in favourable circumstances the observers in balloons could see a great deal, yet there were many shortcomings in the organisation. The transport arrangements were not all that they might have been. The gas cylinders then in use were not best suited to mobile operations in the field. Small balloons would not give good service when flown from elevated ground. There was



**AN EARLY R.N.A.S. INCIDENT : Com. Samson preparing to fly off a platform on the deck of H.M.S. *Hibernia* in an early Short biplane.**



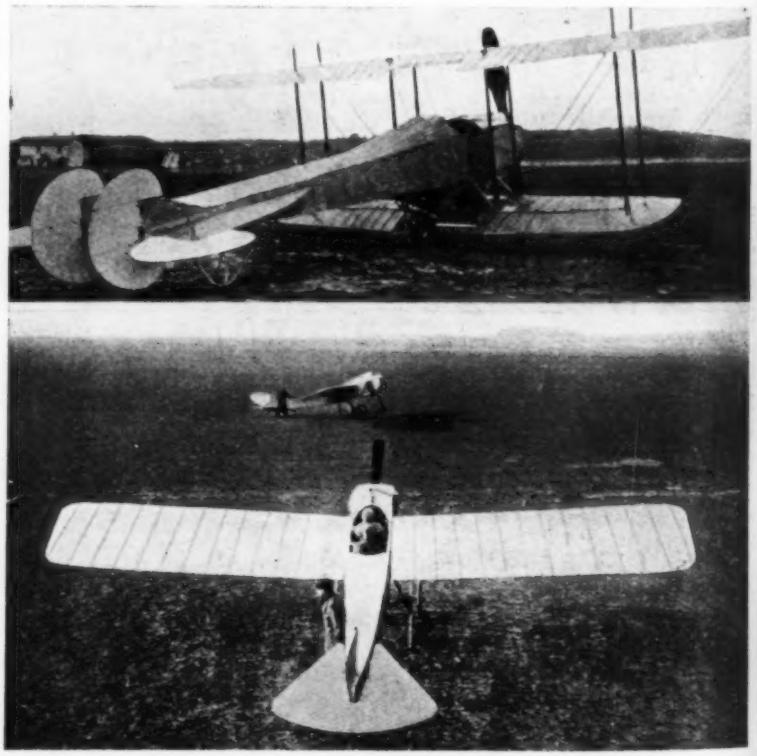

COMPETITORS IN THE MILITARY TRIALS OF 1912: This competition was won by Mr. Cody on the biplane which he designed and largely built himself. These Sketches are reproduced from FLIGHT of August 3, 1912.

**AT THE MILITARY TRIALS, 1912 : Left to right, Maj. F. H. Sykes, Brig. Gen. David Henderson, Mr. S. F. Cody and Mr. Howard Pixton.** (FLIGHT *Photo.*)

no recognised and proved system of rapid communication between the observer in the air and the units on the ground. Those things might have been found out before and been set right, and then the balloons would have been of very considerable use. Still, the Army did give balloons a trial, and would probably have developed them to be the most useful and important method of reconnaissance if they had not been surpassed in usefulness by a new form of aircraft. Even so, kite balloons were extensively used on both sides in the great war, and with very considerable advantage to the users.

The experience of the Army with early and experimental aeroplanes likewise showed that the military authorities were not devoid of vision. No inventor could have asked for more enthusiastic help than Mr. Cody received. But when Cody's aeroplane won both prizes in the military competition in July, 1912, but proved not so suitable for the Army's use as some other aeroplanes produced by individuals who had not been backed by State funds, the Army must have felt inclined to regret its departure from its usual policy. For once the authorities had actively come to the help of an inventor, and it was not the official protegé but private enterprise which had produced the most useful results. At the same time the Army deserves credit for having established the Royal Aircraft Factory, which had produced the B.E. biplane, the most useful aeroplane of the day. By securing the services of civilians like Geoffrey de Havilland and T. E. Busk and making them into officials, the Army did more for aeronautics than it did by helping Cody or than it would have done if it had hurried to purchase the Wright patents when they were offered to it.

Another point which should be noted in the struggle to obtain recognition for aircraft by the Army is that in the balloon days the enthusiasts who espoused the new cause were not private individuals, possibly in search of a fortune, but officers, either of the regular Army or of the Militia. The first name which we need put on record (though there had been earlier enthusiasts) is that of Capt. (afterwards Col.) J. L. B. Templer, of the 2nd Middlesex Militia, who was an experienced aeronaut. In 1878 he was permitted to instruct several officers of the Royal Engineers in the art of ballooning and a Balloon Committee was formed at Woolwich Arsenal. Later it was known as the Balloon Equipment Store. In 1883 Templer introduced the use of goldbeaters skin for the making of envelopes, engaging a family named Weinling who knew the secret of piecing the skins together. They kept it as a close secret too, and the construction of one balloon was delayed because one of the Weinling youths was sentenced to three months' imprisonment for assaulting the police. Templer then, though with great difficulty, persuaded the mother of the family to teach the secret to two sappers. In 1884 a complete balloon detachment was sent to South Africa to take part in the Bechuanaland expedition under Sir Charles Warren. Experience was gained in field operations, and the Bechuanas were much impressed by this new manifestation of the white man's power. One chief was actually sent up for a short distance in a balloon. While this detachment was still abroad, the Balloon Equipment Store, then at Chatham, was ordered to send another detachment with the expedition to Suakin, and Templer himself went out in command of this. Some quite useful work was done by the balloons on this expedition. In 1887 Major Templer was gazetted Instructor in Ballooning, and his salary of £600 a year was provided in Army Estimates. This put the balloon establishment on a recognised official footing for the first time. Two years later Sir Evelyn Wood was so much impressed by the observation work of balloons on manœuvres at Aldershot



**TWO SCHOOLS OF THOUGHT : Entered for the military trials of 1912, the upper machine is the Coventry Ordnance biplane designed by Mr. W. O. Manning and, below, the Bristol monoplane designed by Pierre Prier.** (FLIGHT *Photos.*)

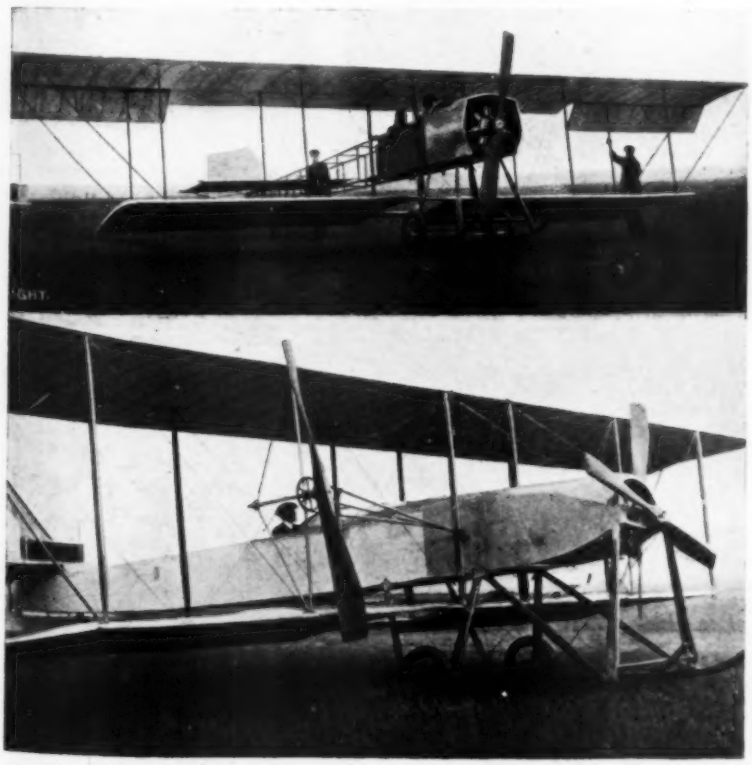
that he became a convert to the air and recommended that the Balloon Establishment should be transferred from Chatham to Aldershot. In 1890, doubtless as a result of Sir Evelyn Wood's conversion, a Balloon Section was authorised in Army Estimates as a unit of the Royal Engineers, with a strength of three officers, three sergeants, and 28 rank and file. The move to Aldershot, which took a long time to complete, resulted in the foundation of the now famous air station at South Farnborough. In 1894 man-lifting kites were added to the equipment of the Balloon Section, chiefly due to the efforts of Capt. B. F. S. Baden-Powell of the Scots Guards. This represented the first activities of the Army with heavier-than-air aircraft.

When the South African war broke out in 1899, a detachment of the Balloon Section was sent out with the Expeditionary Force, and one section accompanied Lord Methuen's column. At the battle of Magersfontein a balloon turned the howitzers on to the ponies of the Boers in a gully in the rear of the Boer position, and some 200 of them were killed, which naturally hampered the mobility of the Boer force. After the arrival of Lord Roberts, and the turning of the Boer flank at the Modder River by the cavalry under French, a balloon discovered the position of Cronje's laager at Paadeberg. Another section was with Sir George White in the siege of Ladysmith, and made useful observations until the supply of hydrogen ran short. This campaign showed up the deficiencies of the organisation, which were chiefly due to the smallness of the funds devoted to the development of the Balloon Section, and the occasional successes of the balloons did not seem to counterbalance their failures. They had not yet become a reliable means of reconnoitring. The gas cylinders were difficult to transport, but the main fault was that no good system of signalling between the air and the ground had been devised. Flags were used for that purpose, but the artillery had not been trained to work with the air observer. The same difficulty was experienced in the early stages of the Great War with aeroplane observation for the artillery, and the difficulties were not satisfactorily overcome until wireless sets were made light enough to be taken up in aeroplanes.

The South African war ended in 1902. Next year the Wright brothers made the first aeroplane flight in America. Five years later A. V. Roe succeeded in designing, building and flying the first British aeroplane. The French pioneers were also successful, and many Britons learnt to fly on French machines. Flying was, so to speak, in the air. Again the War Office watched the new movement cautiously and carefully. Naturally, so long as aeroplanes could only venture to take off in a flat calm, the Army authorities were not much impressed with their potentialities for military service. They were, however, struck by the success of the airships of Santos-Dumont. Col. Templer went to Paris to see them in 1902, and in 1907 the Balloon Factory at Farnborough produced the first British military airship, the *Nulli Secundus*. The Balloon Section was not, however, indifferent to the progress being made with aeroplanes, and in 1906 Lt. J. W. Dunne, of the Wiltshire Regiment, was attached to the Balloon Factory at Farnborough to make full scale experiments with his automatically stable design, while in 1907-8 Mr. Cody was allowed to use the 50 h.p. "Antoinette" engine of the *Nulli Secundus* and to commence building his aeroplane at the Factory.

By the beginning of 1911 the War Office had been sufficiently impressed by the encouragement given to the aeroplane in the French Army to feel that they could no longer remain officially indifferent to the military possibilities of this new invention. In the autumn of 1910 they announced in the Press that it had been decided "to enlarge the scope of the work hitherto carried out at the Balloon School at Farnborough by affording facilities for aeroplaning as well as by developing the training in the employment of dirigibles more fully

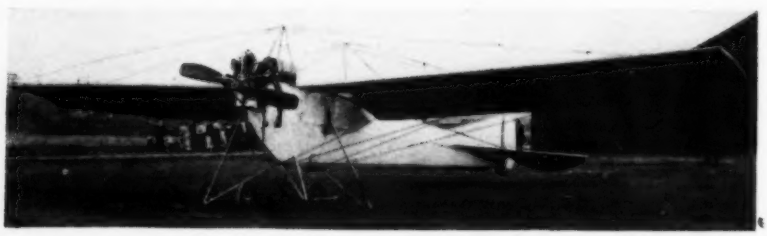
**THREE C.F.S. OFFICERS IN 1914: Left to right, Maj. H. M. Trenchard, Capt. Godfrey Paine and Asst. Paymaster G. H. Lidderdale, R.N.**



**TWO EARLY SHORT MACHINES: A tractor biplane (Gnome rotary engine) belonging to Mr. F. McClean, and below, the first Short twin-engined biplane, which had two Gnome rotary engines driving three airscrews.** (FLIGHT *Photos.*)

AN ARMY AIRCRAFT FACTORY PRODUCT : The B.E.8. (FLIGHT *Photo.*)

EARLY METAL CONSTRUCTION : The Blackburn all-steel monoplane of 1912.



A 1912 VICKERS MACHINE : This monoplane was largely of steel tube construction.

than has hitherto been the case. The object to be kept in view will be to create a body of expert airmen, etc." This proclamation was followed by an Army Order dated February 28, 1911, announcing the decision to form an Air Battalion.

This was a great step in advance. There were to be two companies in the battalion, No. 1 to deal with airships, which was stationed at South Farnborough, and No. 2 at Larkhill to deal with aeroplanes. Capt. E. M. Maitland, of the Essex Regiment, commanded No. 1 Co., and Capt. J. D. B. Fulton, R.F.A., commanded No. 2 Co. The Balloon Factory became the Army Aircraft Factory, with Mr. Mervyn O'Gorman as Superintendent. The officers of the battalion were drawn from any Army unit, provided that they showed aptitude for air work. The other ranks all belonged to the Royal Engineers. The commanding officer of the battalion was Sir Alexander Bannerman, a balloon expert. The adjutant was Capt. P. W. L. Broke-Smith, who was an airship pilot. Other officers attached to the battalion were Capt. C. J. Burke, of the Royal Irish Regiment, Capt. A. D. Carden, R.E., a meteorological expert, and Lt. B. H. Barrington-Kennett, of the Grenadier Guards. Capt. H. R. M. Brooke-Popham, of the Oxfordshire and Buckinghamshire Light Infantry, joined the battalion early in 1912.

During the summer of 1911, Mr. Cockburn, who had been instructing the naval pilots at Eastchurch, returned to Larkhill and took on the job of instructing the Army men. Some of them had had very little time in the air, and the more experienced among them were yet far short of competence to act as instructors. Soon, however, they all became good pilots. In August the whole of No. 2 Co. set off to fly to Cambridge to take part in Army manœuvres, but only two machines arrived there. Engines were not very reliable in those days.

In November, 1911, the Prime Minister asked the Committee of Imperial Defence to make a further report on developing air navigation for naval and military purposes. The result was the formation of the Royal Flying Corps by Royal Warrant, as stated above. By May 13 the old Air Battalion and its reserve were finally absorbed into the R.F.C. The three men who drew up the detailed plans for the change were Brig.-Gen. David Henderson, Maj. D. S. MacInnes, R.E., and Capt. F. H. Sykes, of the 15th King's Hussars. The Military Wing was to contain seven squadrons of 12 aeroplanes each with two pilots for each machine and an additional number in reserve. The establishment of pilots was to be 364, of whom, it was first intended, half were to be officers and half N.C.O.'s. In practice, however, pilots were almost invariably officers. General Henderson was Director of Military Training at the War Office, and became Director-General of Military Aeronautics until he took command of the R.F.C. in the field. Capt. Sykes was given command of the Military Wing, with Lt. B. H. Barrington-Kennett as adjutant. Meantime, Capt. Brooke-Popham took over command of No. 2 Co. of the Air Battalion at Larkhill, and on May 13 it became No. 3 Squadron, R.F.C. No. 2 Squadron was formed from the nucleus of pilots at Farnborough, with Capt. Burke as CO., and No. 1 Co., which dealt with airships, became No. 1 Squadron, R.F.C., and remained under the command of

C.F.S., UPAVON, IN 1914 : Permanent quarters of the staff. (FLIGHT *Photo.*)

Capt. Maitland. At the end of 1913 this squadron was handed over to the Admiralty, and the officers were transferred to the Naval Wing, afterwards the R.N.A.S. The R.F.C. were without a No. 1 Squadron when the war broke out, but the formation of one was in hand, and was ultimately completed by Maj. Geoffrey Salmond in time for the battle of Neuve Chapelle in 1915.

On the outbreak of war the R.F.C. Military Wing had only four squadrons complete and ready for active service. These were Nos. 2, 3, 4 and 5. A list of the officers who went overseas in August, 1914, with the corps, will be of interest.

*Headquarters*

Brig. Gen. Sir David Henderson, K.C.B., D.S.O.; Lt. Col. F. H. Sykes, 15th Hussars, G.S.O.1; Maj. H. R. M. Brooke-Popham, Ox. and Bucks. L.I., D.A.Q.M.G.; Capt. W. G. H. Salmond, R.A., G.S.O.2; Lt. B. H. Barrington-Kennett, Gren. Gds., D.A.A. and Q.M.G.

*Attached*

Capt. R. H. L. Cordner, R.A.M.C.; Capt. C. G. Buchanan, Indian Army; Lt. the Hon. M. Baring, Intelligence; 2nd Lt. O. G. W. G. Lywood, Norfolk Regt. (Special Reserve), for wireless duties.

*No. 2 Squadron*

Maj. C. J. Burke, Royal Irish Regt.; Capt. G. W. P. Dawes, Royal Berks Regt.; Capt. F. F. Waldron, 19th Hussars; Capt. G. E. Todd, Welch Regt.; Lt. R. B. Martyn, Wilts Regt.; Lt. L. Dawes, Middlesex Regt.; Lt. R. M. Rodwell, W. Yorks Regt.; Lt. M. W. Noel, Liverpool Regt.; Lt. E. R. L. Corballis, R. Dublin Fus.; Lt. H. D. Harvey-Kelly, R. Irish Regt.; Lt. W. R. Freeman, Manchester Regt.; Lt. W. H. C. Mansfield, Shrops. L.I.; Lt. C. B. Spence, R.A.; Capt. A. B. Burdett, York and Lancaster Regt.; Capt. A. Ross-Hume, Scottish Rifles; Lt. D. S. K. Crosbie, A. and S. Highlanders; Lt. C. A. G. L. H. Farie, H.L.I.; Lt. T. L. S. Holbrow, R.E.; 2nd Lt. G. H. Malcolm, R.A.

*Supernumerary*

Maj. C. A. H. Longcroft, Welch Regt.; Capt. U. J. D. Bourke, Ox. and Bucks. L.I.; Capt. W. Lawrence, 7th Battn. Essex Regt. T.F.

**FORERUNNER OF THE 504: In 1912 this Avro biplane did a lot of flying, piloted by Mr. F. P. Raynham.** (FLIGHT *Photo.*)

**PRE-R.F.C.: A French Nieuport monoplane (Gnome rotary engine), piloted by Lt. B. H. Barrington-Kennett, of the Air Battalion, R.E., in an attempt to win the Mortimer Singer Prize.**

*Attached*

Lt. K. R. Van der Spuy, S.A. Defence Forces.

*No. 3 Squadron*

Maj. J. M. Salmond, R. Lancaster Regt.; Capt. P. L. W. Herbert, Sherwood Foresters; Capt. L. E. O. Charlton, D.S.O., Lancs. Fus.; Capt. P. B. Joubert de la Ferté, R.A.; 2nd Lt. V. H. N. Wadham, Hamps. Regt.; Lt. D. L. Allen, R. Irish Fus.; Lt. A. M. Read, Northants. Regt.; Lt. E. L. Conran, 2nd City of London Yeomanry; Lt. A. Christie, R.A.; Lt. A. R. Sheckleton, R. Munster Fus.; 2nd Lt. E. N. Fuller, R.F.C. Special Reserve; Lt. W. C. K. Birch, Yorks. Regt.; Lt. G. F. Pretyman,

**C.F.S., UPAVON, 1914: The meteorological observatory, with the repair shop in the background.** (FLIGHT *Photo.*)

**C.F.S., UPAVON, 1914 : Quarters of N.C.O's. and men.** (FLIGHT *Photo.*)

Somerset L.I.; Lt. W. R. Read, 1st K.D.G.; 2nd Lt. A. Hartree, R.A.; Lt. V. S. E. Lindop, Leinster Regt.; Lt. G. L. Cruikshank, Gordon H. (Special Reserve) ; Lt. W. F. MacNeece, R.W. Kent Regt.; 2nd Lt. L. A. Bryan, S. Irish Horse ; Maj. L. B. Boyd Moss, S. Staffs. Regt.; 2nd Lt. E. W. C. Perry, R.F.C. Special Reserve.

*No. 4 Squadron*

Maj. G. H. Raleigh, Essex Regt.; Capt. G. S. Shephard, R. Fus.; Capt. A. H. L. Soames, 3rd Hussars; Capt. F. J. L. Cogan, R.A.; Lt. P. H. L. Playfair, R.A.; Lt. K. P. Atkinson, R.A., Lt. R. P. Mills, R. Fus. (Special Reserve) ; Lt. T. W. Mulcahy-Morgan, R. Irish Fus.; Lt. R. G. D. Small, Leinster Regt.; Lt. W. G. S. Mitchell, H.L.I.; Lt. G. W. Mapplebeck, Liverpool Regt. (Special Reserve) ; Lt. C. G. Hosking, R.A.; Lt. H. J. A. Roche, R. Munster Fus.; Lt. I. M. Bonham-Carter, Northumberland Fus.; 2nd Lt. A. L. Russell, R.F.C. Special Reserve.

*Wireless Flight*

Lt. D. S. Lewis, R.E.; Lt. B. T. James, R.E.; Lt. S. C. W. Smith, E. Surrey Regt. (Special Reserve).

*Attached*

Capt. D. Le G. Pitcher, Indian Army, and Capt. H. L. Reilly, Indian Army.

*No. 5 Squadron*

Maj. J. F. A. Higgins, D.S.O., R.A.; Capt. D. G. Conner, R.A.; Capt. G. I. Carmichael, R.A.; Capt. R. Grey, Warwick R.H.A. (T.F.) ; Lt. H. F. Glanville, W. India Regt.; Lt. F. G. Small, Connaught Rangers ; Lt. R. O. Abercromby, R.F.C. Special Reserve ; 2nd Lt. C. W. Wilson, R.F.C. Special Reserve ; Lt. H. le M. Brock, R. Warwick Regt.; Lt. R. M. Vaughan, R. Inniskilling Fus.; Lt. L. da C. Penn-Gaskell, Norfolk Regt. (Special Reserve) ; Lt. A. E. Borton, Black Watch ; Lt. Lord G. Wellesley, Gren. Gds.; Lt. C. G. G. Bayly, R.E.; Lt. C. E. C. Rabagliati, K.O.Y.L.I.; 2nd Lt. A. A. B. Thomson, R.F.C. Special Reserve ; 2nd Lt. L. A. Strange, R.F.C. Special Reserve ; 2nd Lt. R. R. Smith-Barry, R.F.C. Special Reserve ; 2nd Lt. D. C. Ware, R.F.C. Special Reserve ; 2nd Lt. V. Waterfall, E. Yorks. Regt. (Special Reserve) Capt. R. A. Boger, R.E.; Capt. B. C. Fairfax, Reserve of Officers.

*Attached*

Lt. G. S. Creed, S.A. Defence Forces.

An Aircraft Park accompanied the four squadrons overseas, under the command of Maj. A. D. Carden, R.E. It will be noted that no officers actually were posted to the R.F.C. All continued to belong to their own regiments or corps, and this practice continued for the first year of the war or so. Afterwards officers with temporary commissions were posted direct to the R.F.C.

There was no homogeneity in the matter of aeroplanes. Nos. 2 and 4 Squadrons had B.E.2 machines, No. 3 Squadron had Blériots and Henri Farmans, and No. 5 had Henri Farmans, Avros, and B.E.8's.

So the Royal Flying Corps, scarcely more than two years old, went out to war. At first the reports which it brought in were received with only partial confidence by the staff, but not many months had passed before no General would undertake a major operation without full reports from the air. So was the faith of the early pioneers justified in the great test of active service.

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**The First Commandant**

The following notification appeared in the *London Gazette* of May 17, 1912:—

Royal Flying Corps (Military Wing).

Capt. Frederick H. Sykes, 15th (The King's) Hussars, from a General Staff Officer, 3rd Grade, at the War Office, to be Commandant and to be granted the Temporary rank of Major while so employed. Dated 13 May, 1912.

War Office,
May 17, 1912.

**Royal Warrant**

The following Royal Warrant was issued as a Special Army Order on April 15, 1912:—

*Royal Flying Corps* (Military Wing).

George R.I.

Whereas We have approved of the establishment of an aeronautical service for naval and military purposes under the designation of the Royal Flying Corps ;

And Whereas it is necessary to form a Military Wing of the Royal Flying Corps to which men of Our Land Forces can be appointed ,

Our Will and Pleasure is that the Royal Flying Corps (Military Wing) shall be deemed to be a corps for the purposes of the Army Act.

Given at Our Court at St. James's this 13th day of April, 1912, in the 2nd year of Our Reign.

By His Majesty's Command,
HALDANE OF CLOAN.

# British Hospitals First Air Pageant

AT Hayes, Middlesex, on Saturday, April 8, in glorious weather, Miss Evelyn Laye opened the first pageant of the series which is being given throughout the country during the summer by British Hospitals Air Pageants. Miss Laye was introduced by the President of the Hayes Hospital, who said that the hospitals were all very much indebted to the kind-hearted flying people who were devoting so much of their time and energies to helping them. Miss Laye was presented with a bouquet, and in return gave the diminutive male donor a kiss, much to his embarrassment. It was a sincere and graceful act of hers to call at the hospital, on her way back to London, leaving the bouquet with them. Over the microphone she made one of the best-chosen short speeches we have heard for a very long time, and incidentally showed up the wisdom of the management in choosing an actress, by giving us all a fine lesson in clear enunciation and delivery.

After declaring the pageant open she did the proper thing by taking a flight with C. W. A. Scott over the hospital, in his record-breaking "Moth."

As in all modern joyriding circuses, the programme consisted of numerous "turns" interspersed with much joy-riding. In this case there were perhaps too many of these turns; maybe the management are a little too ambitious or perhaps the pilots have not practised quite enough, but things certainly dragged a little. Personally, we feel that there should have been fewer "turns," and those should have been fitted in when bookings for joyrides were falling off a little. In these days, when the public are already becoming *blasé* about aircraft, it does not do to keep them waiting while someone races three times round the aerodrome or loops the loop. It is much better to use aerobatics and kindred stunts to stimulate their interest when it flags, rather than to interrupt their desire to take the air themselves.

**(Left to Right) Miss Pauline Gower, Miss Evelyn Laye, Miss Dorothy Spicer. Miss Laye opened the first British Hospitals Pageant at Hayes on April 8.** (FLIGHT *Photo.*)

**Miss Evelyn Laye receiving her bouquet from a youthful but very airminded young man. Behind them is the Rev. E. Hudson, President of the Hayes Hospital.** (FLIGHT *Photo.*)

However, it's not fair to expect a show to run perfectly smoothly the very first time, although nowadays "first nights" are *not* looked upon as trial runs; therefore, we feel that even with joyriding concerns it would pay for the cast to be nearly word-perfect on the occasion of their first appearance.

Apart from this certain amount of perhaps unavoidable dragging, everything went well. Large numbers of the crowd queued up for flights, and although the crowd on this occasion was not of a great size, yet a very fair proportion of them took flights, so we trust that the revenue from joyriding was satisfactory. After Mr. Scott had taken up Miss Evelyn Laye, Miss Pauline Gower then started the joyriding by taking up an old man of 71 for his first flight. Miss Gower is running her own machine in these pageants, and is very ably assisted by Miss Dorothy Spicer in the capacity of mechanic. Mrs. Victor Bruce, with her "Fox," is also giving displays at each Pageant. Great credit is due to these women for undertaking such a strenuous job as this form of joyriding circus undoubtedly is.

As we have already said, joyriding was, during this afternoon at Hayes, interspersed with various "turns." Near the beginning there was a very excellent formation, of some nine machines, which made a circuit of the surrounding country in order to let people see the show had started. Capt. P. Phillips, one of the original joyriding pilots in this country, has apparently at last forsaken the old Avro, and is running amongst other machines a Spartan three-seater ("Hermes IV") for the benefit of those passengers who wish to experience the joys of aerobatics. Flt. Lt. J. B. Pugh puts up a very pretty show

of individual aerobatics in the Miles "Satyr" ("Pobjoy"). This machine is, of course, admirable for the purpose, for not only are its flying characteristics particularly suited to this form of entertainment, but it has the publicity advantage of being an extremely small machine. Mr. E. W. Bonar flies "crazily" around the aerodrome on the "Moth" which has become so well known by virtue of Mr. C. W. Scott's record-breaking flights in it. During the afternoon Mrs. Victor Bruce flew over in her Fairey "Fox" at high speed, but it was impossible to land the machine in the field chosen on this occasion. Many other "turns" were also billed to be shown throughout each display. For example, Mr. Scott's "Moth" is fitted with wireless, and there will be a demonstration of wireless controlled flying. There will, of course, be parachute jumps and some form of air race each afternoon. Bombing and target shooting or "bottle breaking," much in the same way as that popularised at club flying meetings by our old friend "Tommy" Rose, will also help to amuse the public, as will paper cutting, balloon bursting and a humorous item which will be varied according to the circumstances. It is, of course, impossible at this stage to give a full list of the places to be visited—there are some 200 of them—but the following table will enable our readers to see where they may witness the pageant and, it is hoped, take flights themselves, during the next week.

| | | | |
|---|---|---|---|
| April | 14 and 15 | .. .. | Ilford |
| .. | 16 | .. .. .. | Kingston |
| .. | 17 and 18 | .. .. | Walthamstow |
| .. | 19 | .. .. .. | Croydon |
| .. | 20 | .. .. .. | Hitchin |
| .. | 21 and 22 | .. .. | Harrow |
| .. | 23 | .. .. .. | Chingford |

Further lists will be published from time to time.

**Miss Evelyn Laye about to make her flight with Mr. Charles Scott in his well-known "Moth" ("Gipsy II").** (FLIGHT *Photo.*)

Over 17 aircraft will be used throughout the displays, which will include a Handley Page W.8 (Napier "Lion"), a de Havilland "Dragon" ("Gipsy Majors"), "Moths" ("Gipsy"), Fairey "Fox," "Monospar" ("Pobjoy"), Desoutter ("Hermes"), "Fox Moths" ("Gipsy Majors"), Spartans ("Hermes IV"), Avro ("Lynx"), Bristol "Trainers" (Bristol "Lucifers"). As our readers know, the pageants have, as one of their chief objects, a plan to raise a considerable sum of money for British hospitals throughout the country, a laudable object and one which it is hoped will be fulfilled. An adequate income from the joyriding public is often a very problematical matter, but with good publicity and good weather, there should be every chance of this series of displays achieving success.

**Miss Evelyn Laye with a group of the pilots and officials responsible for the British Hospitals Air Displays.** (FLIGHT *Photo.*)

## French Air Scandal

THE trial was concluded on March 30 of André Bouilloux-Lafont and three others accused of bringing false accusations against the Director of Civil Aviation and the head of the Gnome and Rhone Motor Co. The charges were that there was a conspiracy to oust the French Aero-Postale service from the South American route in favour of the Lufthansa line. André Bouilloux-Lafont and Charles Picheron were found guilty of conspiracy to forge documents and Lucien Collin was found guilty of forging Jean de Lubersac was acquitted.

# From the Clubs

## HANWORTH, N.F.S.

During the past week 86 hr. were flown. On Saturday, April 8, Capt. Findlay flew Mr. and Mrs. J. Macalpine to Girwan, Lancashire. The Insurance Flying Club put in 1 hr. 45 min. flying, Mr. Wiltshire successfully carrying out his tests for an "A" licence. Sunday's fine weather accounted for 14 hr. flying. On Tuesday Mr. Snelling had one hour's night flying instruction and in the afternoon the Master of Sempill flew down to Cornwall with the Hon. Mrs. Forbes Sempill and Sir John Lavery, returning in 2 hr. 50 min. with a special consignment of daffodils and other spring flowers for Her Majesty the Queen. The Master of Sempill also flew down to the Cotswold Aero Club's aerodrome at Gloucester. Mr. Pitts successfully carried out tests for his "A" licence, and Messrs. Adinsell and Beardmore carried out cross-country flights to Bristol and Colchester. Mr. Lowe-Wylde's "Drone" is very busy and has been in great demand.

## LONDON AEROPLANE CLUB

On Saturday afternoon, April 8, Mrs. Jean Batten, who recently took a "B" licence with the Club, left in a "Gipsy II Moth" for Lympne, in readiness for her flight to Australia and New Zealand. Mr. A. H. Cook, one of our newest members, has just acquired a Comper "Swift." Messrs. T. S. Fisher and S. Pearce are making good progress to the Cape, and among new members are Messrs. S. W. Collier, J. Marling, W. Goldsmith, P. S. Payne, C. Fisher, and his daughter, Miss Peggy Fisher.

## GRAVESEND AVIATION, LTD.

The Gravesend School of Flying progresses favourably and new members are joining daily. The clubhouse, which must be one of the most up to date in the country, will be opened at Easter. The workshops are being kept busy with repair jobs for neighbouring firms. On Easter Sunday Sir Alan Cobham's Circus will be at Gravesend.

## SURREY AERO CLUB

The Surrey Aero Club regret to announce the resignation from the Committee, and from the Club, of Miss Grace Aitken. She has been with the Club for twelve months and her fellow members congratulate her on her forthcoming marriage. Mr. Beardmore's Junker has been successfully repaired at the Redwing Works at Colchester and its test flights were carried out last week. Mr. Hunter collected his Redwing on Wednesday, and Messrs. Colin Wilson and Buckley visited the Club from Woodford on Sunday. Mr. Starling is going through his "B" licence tests, which should be completed shortly. On Saturday a team of shooters representing Gatwick visited Maidstone, obtaining second place in an inter-aerodrome match. On May 12, after the first day's racing at Gatwick, a Clay Pigeon Shoot will be held for owners, trainers and jockeys, who will shoot in teams of five. Gatwick station, which adjoins the aerodrome, will be open on April 19, when Sir Alan Cobham's National Aviation Day will visit Gatwick.

## MAIDSTONE AERO CLUB

Flying during the week has been steadily increasing, full advantage having been taken of the fine weather. On Thursday Mr. M. Sassoon did his tests for an "A" licence. Visiting aircraft included a "Puss Moth" and a Stinson "Junior." After Easter a series of Navigation Classes will be held, and are already well booked up. On Saturday, April 8, a special Clay Pigeon Shooting Competition was held and was very well attended. The Club will be opened throughout the whole of Easter and visitors are cordially invited. On Easter Monday, April 17, Sir Alan Cobham's "Circus" will visit Maidstone. The usual dance will be held on Sunday from 6 p.m., also on the evening of Easter Monday. On Saturday, April 22, a mounted Gymkhana will be held; a varied selection of events has been made and entries should be sent in as soon as possible.

## READING AERO CLUB

Mrs. Patterson has rejoined the Club to take an Instructor's Course; she learned to fly at Reading in 1930 and took her "B" licence last week. The Miles "Hawk" continues to be a great attraction; it has done 30 hr. flying in the hands of 53 different pilots. Phillips & Powis have sold "Gipsy I Moths" to Mr. Dease of the Irish Flying Club and to the Kent Flying Club, also a "Cirrus Avian" to Witney Aerodrome. Various machines have visited Reading:—"Moths" (assorted!), "Bluebird," "Avian," Klemm, and Avro "Cadet."

## SKEGNESS

Much improved weather during March and the approach of Easter have resulted in a considerable increase in flying of every kind at Skegness. Some 90 hr. in all were flown during the month, being divided into about 30 hr. at taxi work and joyrides and the remainder solo and dual on the Club "Moths." Mr. Dawson carried out his first solo successfully and has passed his tests for his "A" licence, while Messrs. Henshaw and Baskcombe are rapidly approaching the solo stage. Mr. D. Townsend has joined the Club with the intention of taking a "B" licence, and has received preliminary instructions. Taxi trips were carried out to the following places:—

**RUSTICITY AT GATWICK: The charming old timbered clubhouse, situated in delightful grounds, of the Surrey Aero Club at Gatwick.** (FLIGHT *Photo.*)

Cleethorpes, Norwich, London (twice), Birmingham (twice), Liverpool, Lincoln. Bookings on the proposed Birmingham, Nottingham and Skegness service have been exceptionally good and augur well for the success of this service during the summer months, when it is hoped to replace a " Fox Moth " by a larger machine. Considerable work has been carried out in improving the surface of the aerodrome, with the result that slight ridges which appeared to have a fatal fascination for some pilots, have now been removed.

## NEW CLUB FOR BLACKPOOL

Blackpool's Airport Committee have approached the Lancashire Aero Club with a view to giving the flying club at Blackpool a new lease of life. The result of the negotiations is entirely satisfactory and in future there will be a branch of the Lancashire Aero Club at Blackpool, while before three years have passed it has been agreed to move the headquarters to the new club. The Lancashire Club will take over the clubhouse at Blackpool and carry on instruction there in exactly the same way as they are doing at Woodford. Operations will not be suspended at the latter aerodrome and the Club will continue to function there as hitherto. It is also hoped that it will be possible to re-equip the Club as a whole with more modern training aircraft of the type which Avro's have recently produced to replace the " Avian " for club purposes.

## BROOKLANDS

Capt. Davis has returned to Brooklands to find quite a number of new pupils, including Miss Renny Tailyour. Also many old friends are returning from hibernation among whom are Miss Moodie and Mr. Piper. Mr. Corssley, of the College of Aeronautical Engineering, has done his first solo, Mr. Hobday has done his height test and Mr. Midgley has finished his " B " licence tests. Mr. H. J. Penrose, Westland's test pilot, arrived in the " Widgeon " during the week and took a machine for a night flight to Lympne. Brooklands Airways, Ltd., have been very busy, Capt. Ledlie, their chief pilot, having just returned from a flight to Turnhouse. Another busy firm are Pan-Aero Pictures, who have recently taken up quarters for their Breda monoplane at Brooklands. A " Gipsy III Comper " is at Brooklands and a good many pilots have had her up. Mr. Van Marken and Mr. Horden, who are representing Brooklands at the Holland Air Rally, left in a couple of " Moths " for Amsterdam. Many different types of machines have visited Brooklands during the week—" Gipsy Moth," " Puss Moth," " Dragon Moth," Comper " Swift," " Widgeon," " Monospar," Breda Monoplane, B.A.C. " Drone," Spartan " Arrow," " Martlet," " Bluebird," Hawker " Tomtit " and Junkers Monoplane. On Sunday morning a " Dawn Patrol " flew down to Lympne for breakfast, and were met half way by a contingent of the Cinque Ports Club.

## MASONIC FLYING CLUB

The new Masonic Flying Club held a meeting at Brooklands on Sunday afternoon, April 9. Capt. Dismore, of Imperial Airways, flew over from Croydon in an " Argosy," and many more arrived by road. A short flying display was given before tea. Mr. Walker demonstrated the " Gipsy III Comper Swift " and Mr. Lowdell did aerobatics in a Pobjoy model. What caused, perhaps, most interest was Mr. Lowe-Wylde's Baby machines, though a demonstration of a new fire-resisting paint which refused to burn even under the influence of a tin of petrol (" Porcella," a description of which was given in FLIGHT of March 23) ran it close.

## YORKSHIRE AEROPLANE CLUB (N.F.S.)

During the past week 25 hr. were flown. Mr. J. A. Higham has become a member, and among the week's visitors were Capt. Diamant, Maj. Graves and Messrs. Humble and Gairdner. Three taxi flights were carried out to London and one to Kilmarnock. On Saturday, April 1, a very successful supper dance was held.

## HULL AERO CLUB (N.F.S.)

There seems to be an impression that the Club dances and lectures have finished, but this is not the case. On Saturday, April 22, there will be a dance, and the band will be in attendance. The badminton courts are again ready and waiting to be used. It is hoped that soon visits to other clubs will be undertaken, thus carrying on what was started last year. The Committee feel that during 1932 everything was done for the comfort and entertainment of members, and the programme for 1933 is still more attractive. It is now up to members to do all that is in their power to make the Club a success. Especially are owners of cars appealed to. The lack of transport may be the cause of spoiling the dance attendance, so owners are asked to pick up passengers at the Monument Bridge end of Alfred Gelder Street on dance nights.

## ACTIVITY AT SHOREHAM

ONE of the few places where instruction can still be obtained on Avros is the Southern Aero Club at Shoreham. Several pupils have recently joined the Club specifically for this purpose and are taking their " B " licences on this type of machine. A wise move, as a competent pilot of an Avro needs very little instruction on any other type. Their machines are also in demand for hire by film companies who are increasingly making use of aircraft in ordinary films. Many visitors arrive at Shoreham each day—among those last Monday being a " Fox Moth " with the Deputy Mayor of Bristol on board. Members are joining the Club now that the prospect of better weather makes flying more pleasant, and hopes are high that new Club premises will be erected as soon as the joint Municipalities of Brighton, Hove and Worthing open the new Shoreham Aerodrome adjacent to the existing one. This will be one of the best served aerodromes in the country in the matter of road and rail facilities, as a railway station actually adjoins the aerodrome, while main roads run along its north and south boundaries.

## CINQUE PORTS FLYING CLUB

Over 40 hr. have been flown during the past week, and Capt. Davis and Mr. Brown have been kept busy giving dual. Messrs. Geohegan and French have obtained "A" licences, and Messrs. Fitzpatrick and Tom Walls, Jun., have done first solos. Early morning flying is very popular, and Mr. Lowdell from Brooklands is helping in instructing for 2 hr. in the morning and from 4 p.m. till sunset in the evening, until Mr. K. H. F. Waller joins as assistant instructor. The Bristol " Fighter " assembled at the Club for Maj. Parker is now nearly ready for test and Mr. Brown is hoping to test it shortly.

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## THE DE HAVILLAND SCHOOL OF FLYING, HATFIELD, HERTS.

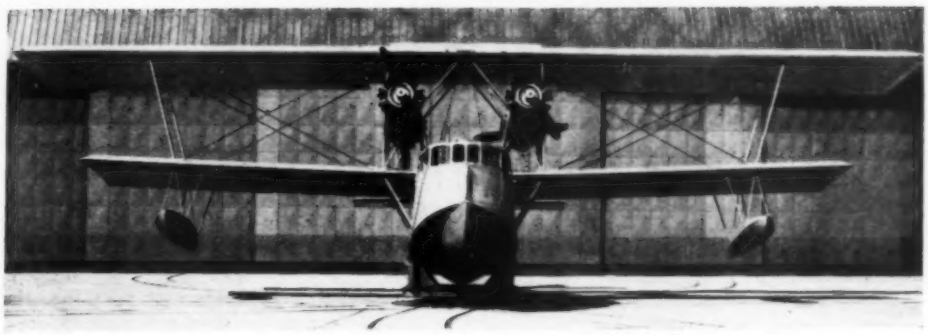
THE School is now equipped with 12 " Tiger Moths " (" Gipsy Major " engines) for use in training Reserve Officers of the Royal Air Force, which embraces general flying, air pilotage, aerobatics, camera gun, blind flying, etc., " Gipsy II Moths " and " Tiger Moths " being used for civilian pupils. The D.H.9.J's which were previously used for R.A.F. training have gone to headquarters at Stag Lane for disposal. G-EAAC deserves special mention, in the first place because it was the third civilian machine to be licensed, and secondly, its log book shows 5,000 hr. flying time. It was always in great demand by pilots up to the time of its disposal a few weeks ago. To perpetuate the memory of this machine the technical staff have constructed an excellent model.

It is interesting to note that the first three registered civilian aircraft were of the de Havilland construction:—G-EAAA (D.H.6); G-EAAB (D.H.4); G-EAAC (D.H.9). Also it is worthy of mention that in 1919 F/O. Giles flew a D.H.9 to Walvis Bay, South Africa, in 10 days in order to join a few friends for a week's shooting! and this before the present efficient refuelling organisation.

One of the School's private members has just returned from a tour of Spain, Morocco, Egypt, Sudan, Palestine and Turkey, and home via Constantinople, Bucharest, Budapest, Vienna, etc., in a " Gipsy II Moth " which ran excellently throughout the trip. The flying time was 129 hr. 55 min. in 39 flying days. Apropos this trip it may be of interest to private owners touring the Sudan that a flat rate of £1 is made on entering the country which covers landings on all aerodromes for one month.

With regard to permits for certain countries abroad, apparently private owners could be spared a lot of unnecessary trouble and delay if, when visiting countries where a special permit is necessary, they were allowed to carry the permits with them. It is humiliating to realise that when one arrives at, say, Palestine or Turkey, full of confidence in the ability of one's Air Ministry to arrange these permissions, one finds the Port of Entry has not been notified, and when we are asked to produce the permission, our faith in the home organisation is rudely shattered. It should not be difficult and would be of great help to private owners if the countries concerned were notified along the route, and the " P.O." carried his own permit along with him.

# Air Transport



**Front view of the CAMS 58² 4-engined flying-boat (300-h.p. Lorraine "Algol").**

## THE NEW CAMS 58² FLYING BOAT

THE Chantiers Aeromarine de la Seine, or the Cams Co., as the well-known French seaplane constructor is known, has just completed a large flying boat, with a hull of metal construction, to be known as the Cams 58². It will be equipped with four Lorraine "Algol" type, air-cooled engines, of 300 h.p. each, and is now making its official trials before the Service Technique.

Designed for service on the Marseilles-Algiers line and other points on the Mediterranean, this new seaplane has been built to meet the requirements of increasing passenger business in those waters.

The Cams flying boats type 53, to replace which this new seaplane 58² is being built, are largely used at the present time by the companies operating the Mediterranean seaplane routes between France and her Colonies, and have done excellent service. They are fast, take off easily, are strongly built and especially seaworthy. Very rough weather is often encountered off the coasts of Algeria and the Islands of Sicily and Sardinia, but these seaplanes have maintained their schedules with a high percentage of efficiency.

These type 53 seaplanes, constructed of wood and equipped with two Hispano-Suisa 600-h.p. engines, are being operated by the Air Orient Co. on the long stretch Marseilles-Beirut, 3,250 km. (2,000 miles) of their France-Indo-China line, and have been transporting mail with great regularity. These seaplanes are also used on the Air Union Co.'s Marseilles-Tunis line, 1,000 km. (625 miles), and on the Marseilles-Algiers seaplane route, 800 km. (500 miles), on both of which they are making daily trips. They have a maximum speed of about 125 m.p.h. and cruise at about 80 to 100 m.p.h.

The Cams, type 53, seaplanes, however, were designed more for postal use, and are not as well adapted as could be desired for the transport of passengers. The accommo-

**LIGHT AND AIRY: An interior view of the cabin of the CAMS 58². The hull framework is of duralumin, while the bulkheads and sheet covering of the hull are of "Vidal," a light aluminium alloy. Note the numerous portholes, which can be opened and give ample light and air.**

**ON TRIAL : THE CAMS 58² making a trial flight at Sartrouville during the Service Technique qualifying tests recently.**

dation of their cabin is somewhat limited, and there are not sufficient portholes to light the interior in a satisfactory manner.

The Cams, type 58², has been built to meet these new requirements. A biplane of semi-thick wing construction, the type 58² has 108 sq. ft. larger wing surface than that of the type 53. The wings are constructed of wood covered with fabric. The upper units consist of a centre section, supported by struts from the roof of the hull and braced to the lower wings. The outer sections are anchored to this centre one and connected by struts and bracing wires to the lower wings. The span of the lower wings is somewhat less than that of the upper ones. They consist of two sections anchored on each side to the top of the hull and braced in addition by slanting struts to the lower part of the hull. Small wing-tip floats are mounted on the lower wings.

The hull of the Cams 58² is of metal construction throughout, composed of a duralumin framework covered with sheets of "Vidal," a light aluminium alloy. The bottom is constructed with two "steps," which together with a pronounced "Vee" in the forward portion, deadens the shock of alighting on the water. The after portion of the bottom is rounded with a gradual taper towards the stern. The hull is divided by bulkheads into the following compartments ; the forward hold, a pilot's cabin, with two seats installed side by side, the radio compartment and a large passenger cabin, 6 ft. 6 in. in height and capable of comfortably seating 12 persons. It is lighted with large portholes, which can be opened. Seats are installed in two rows, facing forwards and separated by a central aisle permitting access to the lavatory and the baggage compartment in the stern.

The power plant consists of four Lorraine type "Algol," 300 CV, radial air-cooled engines, mounted in tandem in two groups under the upper wing. The engine mountings are supported by struts attached to the roof of the hull and are also braced to the lower wings. The engines are thus accessible during flight for repairs. The machine can fly with a full load, on any three of these engines, the fourth one being stopped.

The principal characteristics of the Cams 58² are as follows :—

Span, 79 ft. 9 in. (24,30 m.) ; length, 49 ft. (14,91 m.) ; height, 20 ft. (6,14 m.) ; wing area, 1,337 sq. ft. (124½ sq. m.) ; weight, empty, 11,245·5 lb. (5,100 kg.) ; weight, fuel, 3,969 lb. (1,800 kg.) ; useful, load, 4,189·5 lb. (1,900 kg.) ; weight, loaded, 19,404 lb. (8,800 kg.) ; weight per h.p., 15·94 lb. (7,23 kg.) ; weight per sq. ft., 14.39 lb. (70,203 kg./m²) ; ground speed, 124 m.p.h. (200 k.p.h.) ; landing speed, 62 m.p.h. (100 k.p.h.) ; climb to 3,000 m. (9,843 ft.), 26 minutes ; actual ceiling 14,764 ft. (4,500 m.) ; flight radius (no wind prevailing), 870 miles (1,400 km.).

## Operations of Canadian Airways, Ltd.

A STATISTICAL statement issued recently by Canadian Airways, Ltd., shows that freight and express traffic handled last year was more than double the figures for 1931. The number of passengers carried was also more, though passenger miles were less. With the cancellation of some of the air mail services formerly carried on by the company, the weight of mail handled was considerably less. The company's aeroplanes carried 807 passengers on mail lines and 8,156 on other lines against respective totals of 2,371 and 5,676 in the previous year. The passenger mileage total was 998,619 against 1,111,628. Mail, freight and express traffic last year totalled 2,169,202 lb. compared with 1,223,908 lb. in 1931. Of these totals mail contributed 299,066 lb. in 1932 and 459,459 lb. in 1931. Freight and express poundage of 1,870,136 for 1932 was more than double the 764,449 lb. handled in the previous year. The lb.-miles flown by the company in 1932 totalled 281,541,208 compared with 173,895,707 in the preceding year.

## Progress of Air Transport in Scotland

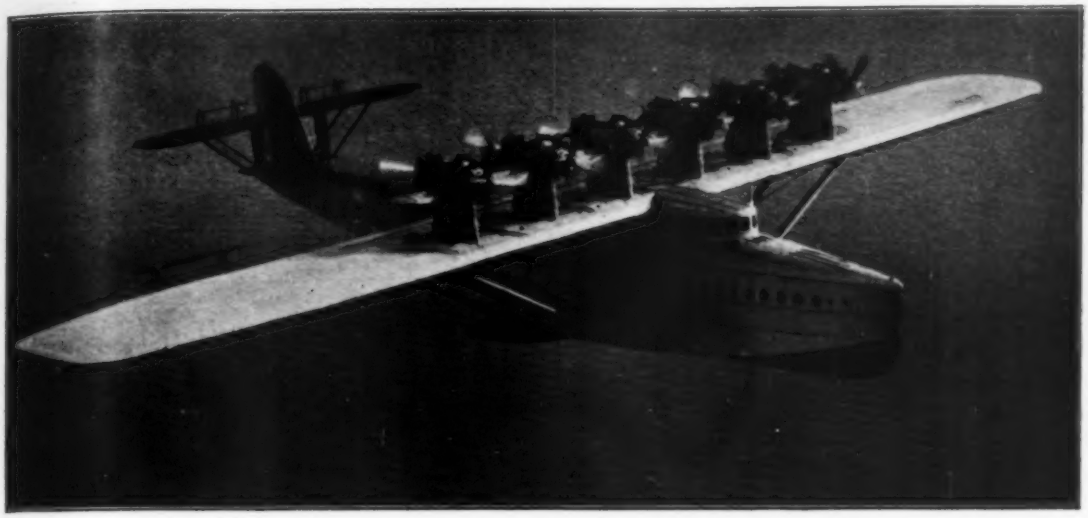
THERE is every indication that the coming season will be a busy one in Scotland and the North as far as air transport is concerned. We have already referred to the activities of the Scottish Motor Traction Co., Ltd., and of Highland Airways, Ltd., and to these must be added Midland & Scottish Air Ferries, Ltd. This latter concern has only just recently been registered in Edinburgh as a private company, with a nominal capital of £20,000, the objects including the operation of aircraft. Mr. J. C. Sword (who is also the Western manager of the Scottish Motor Traction Co., Ltd.) and Mrs. Christina G. Sword, of Craigwell, Ayr, are Directors, and Airspeed "Ferries" and D.H. "Dragons" will probably be used. Following on our reference last week to Highland Airways, Ltd., it is now reported that Capt. Fruson, general manager of the company, hopes to extend the Inverness-Orkney service to Aberdeen and subsequently to the Shetland Isles.

## Air Parcels Services to India, East and South Africa

THE Postmaster-General announces that, as from April 10, the present scale of air parcel charges to India, East and South Africa, which is based on a unit of 1 lb., will be replaced by a new ½-lb. scale, the minimum charges being for parcels weighing up to ½ lb. instead of 1 lb. The new rates per ½ lb. will be one-half of the existing charges per lb., viz. :—Sudan, 2s. 3d. per ½ lb. or fraction thereof ; Kenya, Uganda, Tanganyika, Zanzibar, India, 3s. ; Northern Rhodesia, Southern Rhodesia, South Africa, 3s. 6d.

## Night Air Mail Service to Germany

THE Postmaster-General announces that, as from April 10, the latest time of posting air mail correspondence for despatch by the night air mail service to Germany will be 8 p.m. instead of 7 p.m. in the air mail letter-box outside the General Post Office, London. The latest time of posting air mail parcels for Austria, Czechoslovakia, Germany and Hungary for despatch by the night air service will be 6.30 p.m. instead of 5.30 p.m. at the General Post Office, London. Collections from other boxes will similarly be an hour later than at present.



**THE DO.X 1 : This first version was fitted with 12 Siemens " Jupiter " engines.**

# Lessons of the Do.X

**By DR. C. DORNIER**

THE paper under above title was read before the Royal Aeronautical Society in the lecture hall of the Institution of Civil Engineers on April 6. Mr. C. R. Fairey, who was in the chair, said that before proceeding to the business of the evening it was his sad task to refer to the disaster that had overtaken the American airship, the *Akron*. Their deepest sympathy would go out to the United States Navy and to the relatives of the victims of that disaster. It was inevitable that this should bring to mind the British loss of the *R.101* with many lives, and the earlier Anglo-American disaster to *R.38*, which the two nations shared together. Doubtless they would remember that not long ago a paper was read before the Society, in which high tribute was paid to the skill and courage of those responsible for the *Akron*, and in which were expressed the high hopes placed on it. These were now dashed to the ground, and, unfortunately, a disaster of this kind gave defeatism an opportunity to raise its head, and to demand a cessation of further work. That, however, was not the right way to look at it. Mankind did not turn back once it had set its feet on the path of progress. Disasters might delay, but could not prevent, progress.

Turning to the subject of the paper to be read that evening, Mr. Fairey said that he was extremely sorry to say that Dr. Dornier had found it impossible to be present in person to read the paper. Circumstances beyond his control had made it impossible, but he had sent one of his technical assistants, Herr Schuettel, to read the paper and to reply to such questions as could be answered in Dr. Dornier's absence. Herr Schuettel then read the paper, which we give *in extenso*.

In the spring of 1928 I had the honour to lecture on the subject of a family of flying boats, and on that occasion, for the first time, I made public details of the flying ship then under construction, and which eventually became the well-known flying ship Do.X.

The data which I then gave led to what was, for me, an unforgettable discussion, in the course of which naturally many doubts were expressed as to the possibility of translating them into practice and the possibility of obtaining in practice the calculated performances.

Doubt was expressed in several quarters whether the suggested aircraft would succeed even in rising into the air, and in the improbable event of that happening it was feared that an enormously long " take off " and " landing " run would be required.

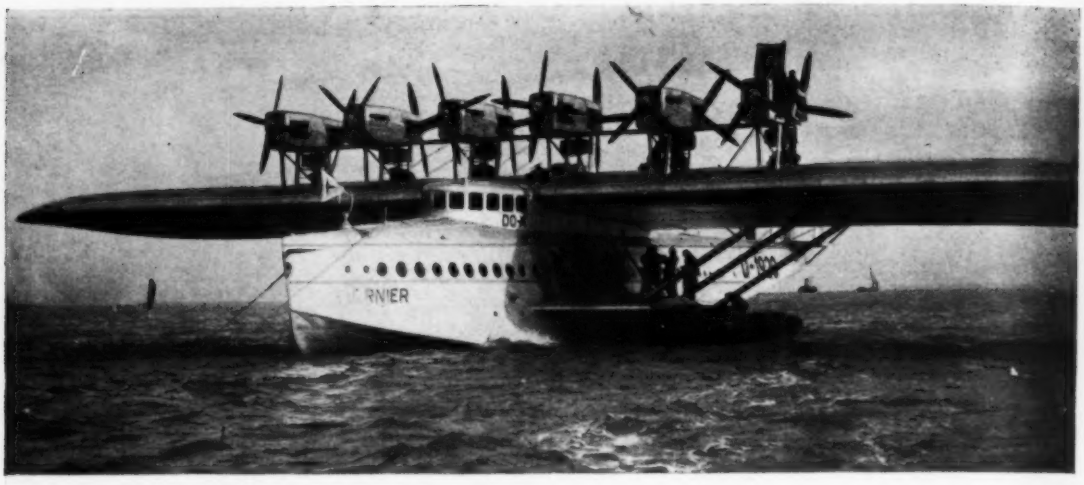
Much doubt was also expressed as to the ship's flying characteristics—it was feared that the stability in the air would prove insufficient. It was pointed out that if the aircraft should actually rise into the air it would only do so as the result of non-adherence to the regulations for aircraft structures in the matter of factors of safety.

As regards the pilot of such a boat it was, as far as I can recollect, remarked that in order to operate the number of levers and instruments necessary for 12 engines he would require to have the manual dexterity of a Paderewski. It was particularly doubted whether with such a large boat it would be possible to obtain a reasonable ratio between unladen weight and useful load.

I have taken the liberty of referring to this discussion, which took place five years ago, as it occurred in circles whose competence cannot be denied in questions of this nature. The fact that such serious doubts were then expressed goes to show the technical position at that time. It also goes to prove the difficulties which stood in the way of undertaking the construction of a flying boat of that size. The difficulties were not only on the technical and material side but arose to a large extent, I would like to say, from the nearly unanimous rejection of the idea of flying ships by the technical world. To-day everyone knows that flying boats of the size and weight which I then described in your company for the first time, can " take off," fly and land, and that the pilots need not be specially trained artists. Indeed one has now very nearly forgotten that it is only a few years since the idea of a flying ship was looked upon as Utopian. But when to-day the flying ship is acknowledged to be a *fait accompli* and all manner of projects for flying boats are evolved compared with which our Do.X is as a gnat to an elephant, technical circles are nevertheless still far from acknowledging the flying ship to be either a necessary or a useful instrument worthy of further development.

Opinions to-day as to the importance of flying ships are very divided, and if what I am about to say should contribute towards clarifying the position, I should count it as an achievement.

Those among you who specialise in the construction of flying boats may know of my lecture on " The Flying Ship " which I gave before the German Aeronautical Scientific Society, the Wissenschaftliche Gesellschaft für Luftfahrt, in 1929 in Berlin, at which I outlined the constructional details of the first flying ship, and also another lecture which I gave in 1931 at the Technical High School,



**THE DO.X 1A: In order to get higher cruising horse-power 12 Curtiss "Conqueror" engines were installed.** (FLIGHT *Photo.*)

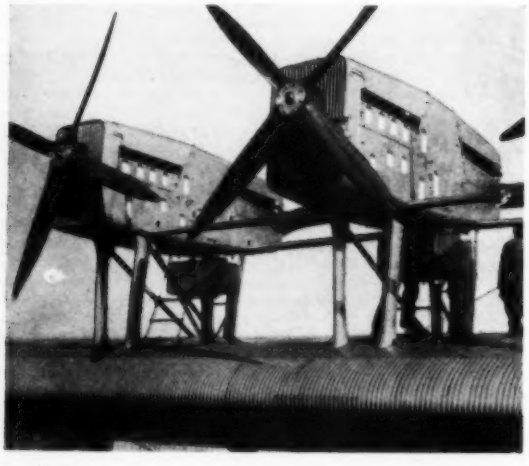
Munich, on the subject of "Flying Boats," and some of you had the opportunity of inspecting the Do.X in Friedrichshafen and also at Calshot. There we had the honour, not only of greeting His Royal Highness the Prince of Wales on board, but also the pleasure of his piloting the ship.

I can, therefore, refrain from describing details of the construction, and will only touch upon such as have either proved their worth or have shown that they required modification.

The subject matter of this lecture will cover three different examples of the original Do.X 1 aircraft fitted with air-cooled engines, which, in my previous lecture, was marked "E." After its acceptance, this boat was fitted with water-cooled engines, and I shall refer to it in this form in future as Do.X 1a.

The third type, of which two examples have been built to the order of an Italian group, will be referred to as Do.X 2.

The preliminary work on the first flying ship was begun in the year 1924. A large number of designs were produced and the number of engines with which they were to be fitted ranged between seven and twelve. All designs, however, incorporated one central hull and a single wing. During the design period a large number of models were constructed and a "mock-up" of the eventual design was built to full scale, with every instrument, lever, and fitting installed.



**CONQUERORS: To save time and expense, these engines were mounted on ordinary strut supports and old radiators were used.**

This system of using "mock-ups" for all details proved so extraordinarily useful that we now build no new aircraft without first constructing it in wood and cardboard to full size and with all equipment.

The guiding principle throughout the design period was only to make use of such features as had been proved technically sound. All experimenting was avoided if it was possible to do so. It is clear that owing to this policy original design was handicapped to a certain extent. The fact, however, that from the time that tests started to the time the ship's flying tests were carried out, only a total of a few hundred working hours were required for alterations to the aircraft, proves the correctness of the system adopted.

In the summer of 1926 the general layout was finally decided upon. In December, 1926, design was started. One year later construction was begun in the works at Altenrhein. The launch, together with the first flight, took place on July 12, 1929. The Do.X 1 was taken over on February 20, 1930.

The tests carried out in the autumn and winter of 1930 showed that the air-cooled engines were not able to develop the 400 h.p. continuously, which our calculations required.

The guaranteed contract performances regarding weight, speed and "take off" were unquestionably obtained, but we were compelled sometimes to fly at engine revolutions which, as it very soon proved, were too high for this particular type of engine. This was a very hard blow to us. The reduction in the actual available cruising horse-power had so altered the whole performance of the flying ship as to preclude the possibility of her achieving the purpose for which she had been built. In the spring of 1930, therefore, we had to decide either to instal engines of sufficient normal power, say, of 420 h.p., in order to prove the usefulness of flying boats in practice, or to bury all thoughts of vindicating this new method of transport for a good many years.

The choice of air-cooled engines was made in order to keep down the weight of the ship as compared with water-cooled engines. In choosing air-cooled engines, however, the mistake had been made, owing to lack of experience, of overlooking the ratio between cruising horse-power and full power, and conclusions were thus drawn adverse to water-cooled engines.

As more powerful air-cooled engines were not available, and as, in addition, serious trouble had developed through the insufficient and irregular cylinder cooling of the aft engines, it was eventually decided to instal water-cooled engines. The increase in weight resulting from the change was proved in subsequent tests to have been more than compensated for by the higher cruising horse-power available. Curtiss Wright "Conqueror" engines with a reduction gear of 2 to 1 were fitted. The maximum power of these engines is 615 h.p., developed at 2,450 revolutions, and the

guaranteed cruising horse-power is 415 at 2,150 revolutions. Unfortunately, during the installation of the new engines we were obliged to sanction a number of compromises in the interest of economy both of time and of money. For instance the mountings for the new engines had to be made to fit the attachments for the old engine mountings, and this made it impossible to increase the diameter of the airscrews—although that was most desirable in view of the increase in efficiency that would have resulted. In order to save as much time as possible we refrained from streamlining the engine nacelle supports and had to content ourselves with ordinary strut construction. Also the arrangement of the radiators differed radically from what we would have liked. On the ground of economy, old radiators that we happened to have were fitted, and these, as it happened, proved reasonably suitable under all kinds of climatic conditions and also during long periods of taxying. From the point of view of obtaining the highest possible speed, however, their design and position left much to be desired.

In the course of tests of the Do.X 1a it became evident that the omission of the streamline casing from the engine supports considerably reduced the accessibility of the engines in flight. For this reason, in the subsequent new version, the type Do.X 2, enclosed access to the engines was reintroduced, and this shaft served the dual purpose of housing the radiators. A further improvement in the Do.X 2 resulted from the oil coolers, which on the Do.X 1a had been attached to the outside of the cowling, being combined with the water radiators.

In Table I comparative figures are given of the weight of the power plant of the three different types. On the basis of the cruising horse-power available, the air-cooled

**CATERING FOR THE INNER MAN: The dining room on the Do.X.**

design gives a weight of 1.885 kg. per horse-power, the American engines a weight of 1.624 kg. per horse-power, and the Italian engines a weight of 1.620 kg. per horse-power.

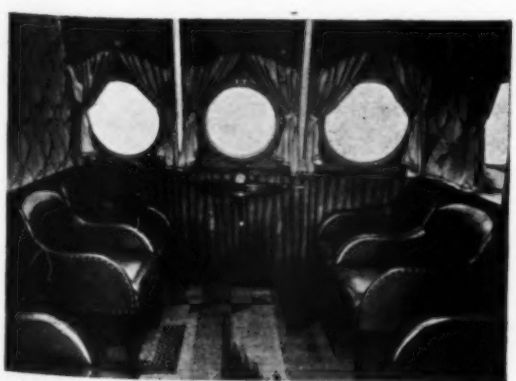
The change over to water-cooled engines in the Do.X 1 took place in the spring of 1930, and in August of the same year the first flight was made.

After three months tests on the Bodensee the Do.X 1a began her long distance test flights, about which you have

TABLE I

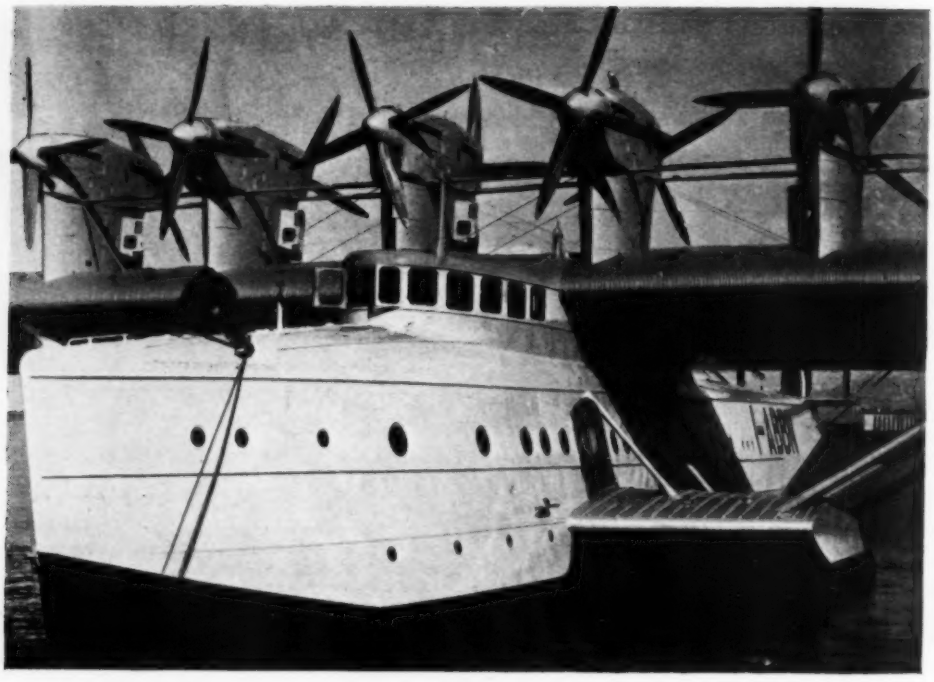
*Weight of Engine Installations.*

| Section: Power Unit | Do.X 1 with 12 Siemens "Jupiter" Engines (geared) | Do.X 1a with 12 Curtiss "Conqueror" Engines (geared) | Do.X 2 with 12 Fiat A22 Engines (geared) |
|---|---|---|---|
| Engines with exhausts, fuel pumps and fittings, carburettor preheating, air intake for carburettor, oil radiator and the minimum permissible quantities of engine lubricating oil .. .. .. | 5,461 kg. | 5,219 kg. | 6,237 kg. |
| Radiator installation complete with water, air scoop in the case of air-cooled engines .. .. .. .. .. .. .. | 74 ,, | 1,691 ,, | 2,394 ,, |
| Engine starting gear .. .. .. .. .. .. .. .. | 146 ,, | 169 ,, | 148 ,, |
| Engine controls .. .. .. .. .. .. .. .. | 224 ,, | 208 ,, | 249 ,, |
| Airscrews with bosses .. .. .. .. .. .. .. | 1,102 ,, | 796 ,, | 1,075 ,, |
| Total weight in kilogrammes .. .. .. .. .. .. | 7,007 ,, | 8,083 ,, | 10,103 ,, |
| Difference in weight compared with air-cooled engine installation .. | | + 1,076 ,, | + 3,096 ,, |
| Permissible normal revolutions .. .. .. .. .. .. | 1,700 r.p.m. | 2,150 r.p.m. | 1,950 r.p.m. |
| Permissible normal cruising horse-power .. .. .. .. | 310 | 415 | 520 |
| Permissible maximum revolutions .. .. .. .. .. | 2,100 r.p.m. | 2,450 r.p.m. | 2,100 r.p.m. |
| Permissible maximum horse-power .. .. .. .. .. | 500 | 610 | 630 |
| Weight of power unit per horse-power at cruising output .. .. | 1·885 kg. | 1·624 kg. | 1·620 kg. |
| Weight of power unit per horse-power at maximum output .. .. | 1·168 ,, | 1·105 ,, | 1·337 ,, |



**"GENTLEMEN, YOU MAY SMOKE": On the Do.X one does so in pleasant surroundings.**

no doubt already heard and which included a double crossing of the Atlantic. This new departure from the accepted practice in aircraft tests arcused considerable and widespread criticism. But I am convinced that in the conditions then obtaining there was no other way of collecting the variety of information we required and at the same time of demonstrating the possibility of the flying ship idea. I must admit that I seriously underestimated one factor, namely, the importance of the crew becoming thoroughly accustomed to the ship. We had chosen our best people, but at the beginning both officers and crew were insufficiently "au fait" with this new instrument; the feeling of responsibility for the safety of this large boat, too, reacted on the judgment of the officers. It thus came about and was duly observed that at the beginning of the tests the speed of the flight was extraordinarily slow. To-day, when one considers the flight as a whole, it is easy to see how improving acquaintance and increased trust in the ship on the part of its crew was reflected in an increased rate of operation. The flights were never intended to set up records; at the same time it is interesting to note that a full three weeks were required from Altenrhein to Lisbon,



**WHEN TIME PERMITTED : On the Do.X 2 the Fiat A.22 engines were mounted on streamline supports, which gave good access during flight, and which also accommodated the radiators.**

whereas approximately the same time was required from Rio to New York, and from New York to Berlin took five days.

The flying ship Do.X 1a, took off from Altenrhein on November 5, 1930, for its great flight, and returned to the works on November 15, 1932. During these 740 days the ship was continually in the open. One is entitled to assume that on such a flight, which extended over two years and during which time 65 different ports in three different continents were visited, the flying ship must have got into difficult situations and bad weather. The fact that the Do.X 1a actually only required minor overhaul work on its return to Altenrhein provides definite evidence as to the serviceability of the flying ship.

In any case, by adopting this form of test flight, we have gained a great deal of experience which would otherwise have taken very much longer to obtain.

I would now like to say something about our experiences, both those of a satisfactory nature as well as those that were the opposite.

### Power Units

During the whole of the test cruise no flight which was actually started had to be curtailed through failure of the power units. No trouble arose through the multiplicity of the engines. The number of engines, on the contrary, considerably increased the crew's feeling of security in the ship. The practice was gradually developed, when an engine was not running smoothly, of throttling it down and not taking much notice of it. The engines were always started within a reasonable time, which varied between three minutes and a quarter of an hour. But the mechanics suffered, especially in the tropics, owing to the necessity of starting the engines by hand.

The arrangement of the engines proved excellent for manœuvrability. A certain technique in manœuvring was developed, in that all engines were switched off with the exception of the extreme outside starboard and port engines, and by alternatively using the throttles it was found possible to control the ship admirably.

If I were asked whether I would, in future, be afraid to use 12 engines again in a new design my answer would be that I should have no hesitation in doing so. One thing, however, is certain, and that is that the use of larger power units arranged inside the wing would lead to substantial aerodynamical advantages. We have, for instance, found that by doing away with the engine nacelles and their supports an increase of nearly 50 km. per hour will result—equivalent to an increased operational radius of 25 per cent.

This gain, however, has certain disadvantages. For instance, the present arrangement of engines and airscrews above the plane has proved ideal for manœuvring the flying boat on the water. All overhauls of the engines, radiators and airscrews can, in addition, be carried out quite easily while the boat is in the water. The wing is, so to speak, the platform from which everything is easily accessible. The airscrews are out of the way of the spray and cannot be damaged in collision. This is borne out by the fact that every airscrew completed the two years' flight without defect and all are to-day absolutely fit for service. Going alongside, heaving a line, disembarking and embarking can be done without thought for the airscrews. But as soon as larger power units are available the airscrew diameter will become so large that a lot of difficulties will be unavoidable with this arrangement of the engines. Supervision of the engines was carried out, in the main, from the so-called " switch room " in which two men were continually on duty. During the flight it was usual for one mechanic to stand by for each pair of engines so as to be available immediately in the event of a breakdown. The pilots of the ship are, as is well known, not responsible for the supervision of the engines. At first this gave rise to all manner of qualms, as our pilots were accustomed to well-equipped instrument boards and were unable at once to adjust themselves to the new conditions. However, they soon became accustomed to it, and for my part there is no doubt that in future the pilots of large aircraft will always be relieved of the responsibility for supervising the engines.

### Fuel Installation

The fuel is stored in cylindrical containers situated in the bottom of the hull. This arrangement has, without exception, been adhered to for more than 15 years in our large boats. The containers are made of duralumin and each has a maximum capacity of 3,000 litres. The total fuel carried by Do.X 1a was approximately 26,000 litres. The containers are connected to a petrol exchange from which petrol is pumped to two small tanks in the leading edge of the wing. To ensure as far as possible against a failure of the petrol supply three alternative systems were

available, a wind-driven pump, an electrically-driven pump and a hand-operated semi-rotary pump. From the wing tanks the petrol was delivered to the carburettors by means of "AM" pumps, and any excess of petrol flowed back to the petrol exchange. The whole of the petrol system is easily accessible in the air and gave practically no trouble during the whole flight.

The storage of petrol in the hull differs radically from the customary method in England of storing it in the wings. I decided upon the former system out of deference to the idea that petrol should be stored as far away as possible from the engines and all kinds of electrical equipment. The desire to lower the centre of gravity as much as possible, also played its part in that decision, a factor of less importance to English designers who employ auxiliary floats than to us who use stub wings. I am firmly convinced that the ship would have been a total loss through the fire in the wing at Lisbon, at a time when she contained 20,000 litres of petrol, if the fuel had been stored in the wings; in fact, any approach to the burning flying boat would in that case hardly have been attempted. At Lisbon the Captain filled that portion of the ship which contained the tanks with fire extinguishing gas, and the watch on duty were enabled to prevent the fire spreading to the leading edge tanks and to the engine nacelles by means of fire extinguishers.

The tanks and their mountings remained sound even after taking off in high seas with a heavily loaded boat, and no leaking whatsoever was experienced.

The system of storing petrol is capable, in my opinion, of substantial improvement and simplification if one is prepared to depart from the idea of special tanks and so construct the bottom of the boat that the fuel is carried in a form of double hull.

According to our calculations, this method would, in a boat the size of the Do.X, save at least 500 kg. in weight.

This arrangement would have the further advantage of allowing the petrol to be protected from catching fire by means of a non-inflammable gas.

The Do.X was not fitted with quick petrol releasing gear, which is strongly favoured at present. I also question whether such gear is really required on a boat with 12 separate power units.

### Tanking

When one considers that during the Do.X 1a test flights approximately 400,000 litres of petrol were taken in it is obvious that the work of refuelling a flying ship is a very important business. By means of refuelling pipe lines permanently built in to the boat, and a semi-rotary pump, which was always carried and which used to be placed on the stub planes, it was possible to take in up to 6,000 litres of petrol per hour.

*(To be concluded.)*

## Spartan Air Lines

ON April 12 and thence during week-ends until some time in May, Spartan Air Lines opened their service between Heston and Cowes. At the start there will be two trips each way per day, but later as the demand increases and when the service is running every day of the week three, or possibly four, trips will be made. For the present the first Spartan "Cruiser" demonstration machine will be used with accommodation for six passengers, but early in May a machine of the latest type will be taken into service carrying seven passengers. Imperial Airways are acting as general agents for the air line and bookings can be made either through them at Victoria Station (Vic. 2211) or through Airwork, Ltd. at Heston (Hayes 410) or the Fountain Garage, Ltd., Cowes (Cowes 323) and the Portsmouth, Southsea & Isle of Wight Aviation, Ltd., Portsmouth and Ryde (Ryde 333). The single fare will be 28s. and return 55s., while each passenger will be allowed 30 lb. of luggage free. For the present the time-table will be, departing from Heston at 9.35 a.m. and 6 p.m., arriving at Cowes at 10.25 a.m. and 6.50 p.m. In the reverse direction the machine will leave Cowes at 8.35 a.m. and 5 p.m., arriving at Heston at 9.2 a.m. and 5.50 p.m. In each case a call will be made at Ryde. The Spartan "Cruiser" was fully described in FLIGHT for February 23 and should undoubtedly make a fast, particularly safe, type of machine for this work. Its capability of flying comfortably on any two of its "Hermes IV" engines will inspire confidence in the public and should lead to its wide use by people who are in a hurry.

## London—Thanet by Air

ON Saturday, April 8, Hillman's Airways inaugurated a new service between London and Thanet. The opening ceremony was performed by the Mayor of Ramsgate, Alderman Mrs. Dunn. The machine was full, and the first passenger to alight at Manston was Mr. A. J. Osborne, who presented his ticket to the Mayor. The service, which will serve Margate, Ramsgate, and Broadstairs, will be operated twice a day and should take just over the half hour. The aerodrome used at Manston is adjoining the Service one, but is equipped with hangars and petrol pumps.

## The "City of Liverpool" Disaster

A NEW development in connection with the loss of the Imperial Airways machine *City of Liverpool* began last week, when the funeral of Mr. A. Voss, one of those who lost their lives in the crash, was postponed at the request of the police, in order to probe into the question whether possibly Mr. Voss might have committed suicide and whether he might in some way have been responsible for the crash. The inquest was adjourned until April 27, and Mr. Voss was buried on April 4. In the meantime the examination of the wreckage of the machine in Belgium appears to indicate that there was no structural failure, there was nothing wrong with the engine, and the petrol tank did not explode in the air. It also appears established that the cabin was on fire before the machine struck the ground.

## Graf Zeppelin's South American Service

ON May 6 the German airship *Graf Zeppelin* starts the first of a series of trips between Friedrichshafen and Rio de Janeiro. Altogether nine trips out and home are scheduled, the airship leaving Germany on May 6, June 3, July 1, August 5, September 2, September 16, September 30, October 14, and October 28. Departures from Rio (which is reached on the 11th day) will be: May 11, June 8, July 6, August 10, September 7, September 21, October 5, October 19, and November 2. Calls will be made at Seville on the outward voyage and at Barcelona on the homeward, provided at least four overseas passengers have been booked for these places.

**A JAPANESE FOKKER: A Nakashima Fokker employed by the Japan-Manchurian Air Transport Co. This machine, as well as the "Jupiter" engine, is entirely constructed in Japan.**

# Airisms from the Four Winds

## Italy Claims Speed Record

A REPORT from Italy states that Warrant Officer Francesco Agello, the Italian high-speed pilot, has set up a new speed record of 682.403 k.p.h. (424 m.p.h.), thus beating Flt. Lt. G. H. Stainforth's record of 407.5 m.p.h. Agello, a very quiet and reserved man, is 31 years old, and was reserve pilot to the Italian team which competed for the Schneider Trophy of 1929. With the exception of the leader, Col. Bernasconi, and Lt. Remo Cadringher, he is the only surviving member of that team. He tested most of the Italian High Speed Flight machines, and has himself crashed twice. The flight was made at Desenzano on Lake Garda on Monday, April 10, the machine being a Macchi Castoldi Fiat 72, equipped with two Fiat engines developing 2,500 h.p. The flight was apparently made in the presence of commissioners of the International Aeronautical Federation, and was, according to the reports, timed by the electrical photographic apparatus. The speeds attained in five runs were, in kilometres per hour, 678.477, 682.637, 674.662, 692.529 and 675.971. If this record is confirmed all congratulations are due to Warrant Officer Agello. Great Britain would as soon lose the record to Italy as to any other nation, and they have striven hard enough to deserve success, even to the sacrifice of several good lives. It must be pointed out, however, that the Italian machine in which this flight was made is not comparable with our own Schneider machines. The Italian machine was built entirely for speed work, our's were built to compete for the Schneider Trophy, and had to incorporate in their design certain features which were necessary for navigability tests, and the carrying of a larger supply of petrol, at the expense of speed.

## R.A.F. Cairo-Rhodesian Flight

THE five Fairey "Gordon" aircraft of No. 6 Bombing Squadron engaged in a Service flight to Rhodesia (as was reported in FLIGHT of last issue) arrived at Juba on Tuesday, April 11.

## Flying Boat Cruise

THREE Supermarine Flying Boats of No. 205 Squadron now stationed at Singapore are proceeding on a cruise to Sarawak and North Borneo. Visits will be included to Kuching, Labuan Island, and Kudat and Sandakan in Borneo. No. 205 Squadron is commanded by Wing Com. J. P. Burling, D.S.C., D.F.C., A.F.C., and last year did a successful flight from Singapore to Port Darwin and return.

## Eight Failures

BOUSSOUTROT and Rossi, the long-distance pilots, have failed for the eighth time to set up a new record for a long-distance flight. They took off from Istres aerodrome, Marseilles, at 6.25 on Wednesday morning, April 5, but a petrol leak, over Barcelona, forced them to return.

## French Long-Distance Flight

WHEN the French do a long-distance flight they believe that the ultimate destination should be reached, and the best way to ensure this is to send more than one machine, so that if one goes down another is there to take its place. In November or December of this year 100 French machines will do a long-distance flight, possibly to Madagascar. The itinerary will be Marseilles, Algeria, Morocco, West Africa, Equatorial Africa, Egypt, Tunisia, Marseilles.

## New Machines from A. V. Roe's

AVRO's are bringing out an interesting range of aircraft based on the "Cadet." As our readers know, this machine, largely as a result of its perfect controls, has created an intense amount of interest all over the world. The result has been to create a demand for adaptations of the "Cadet," which will fulfil certain *desiderata*, but which retain the flying characteristics of the original.

The machines will satisfy the demands of a wide range of pilots. For the joy-riding man there is a model with the front cockpit widened to take two passengers side by side. Then there will be models especially suited to the needs of the Club pilot and for the private owner. The latter providing all that comfort and protection which the private owner is now entitled to expect for his passengers and for himself.

The "Cadet" has now been in service for quite a long time; it is only natural, therefore, that certain means of improvement should have become apparent. These will be embodied in the latest "Cadet," which will be intended purely for military and advanced flying training. Any of the series may, of course, be fitted on floats instead of the normal land undercarriage, while the ordinary in-line engines from the Cirrus or de Havilland factories can be used instead of the 7-cylinder "Genet" if preferred.

## "Ask a Policeman"

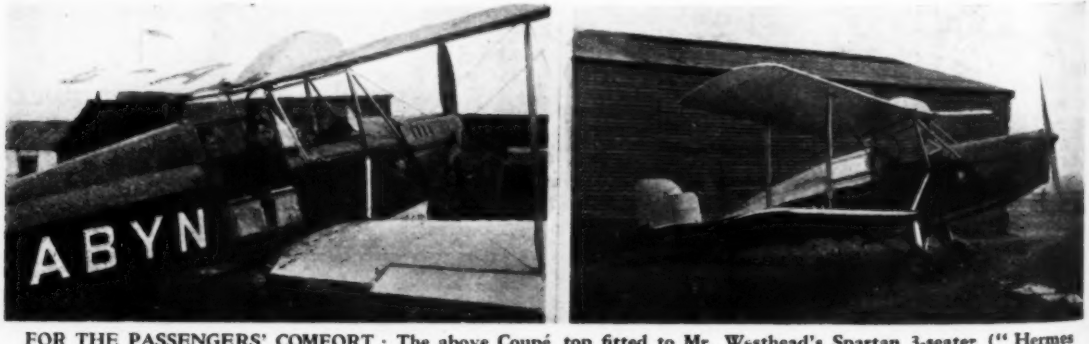
AMONG questions in the general knowledge paper set to West Sussex policemen desirous of promotion is the one "who invented the airplane?" But why should one have to go to Sussex to find out. Anyhow, who did invent an airplane, and incidently what is an airplane?

## Re-organisation of French Air Force

IN the re-organisation of the French Air Force, Divisional-General Bares, Vice-President of the Superior Air Council, has been appointed Inspector-General, with Divisional-General Denain as Chief of the General Air Staff. Eleven other Generals expert in the theory of air command have been appointed to assist him.

## The R.Ae.S. and the S.B.A.C.

THE following important letter has been received by the Royal Aeronautical Society from Sir J. D. Siddeley, Chairman of the Society of Britsh Aircraft Constructors.—"The Society of British Aircraft Constructors have followed with great interest for some years the constant efforts which the Royal Aeronautical Society have made to make Associate Fellowship and Associate Membership of the Society very real qualifications. They are satisfied now that each grade calls for such experience, training and technical knowledge that other things being equal an Associate Fellow or Associate Member of the Royal Aeronautical Society should be chosen for a post in the industry in preference to one not holding one of those qualifications"




**FOR THE PASSENGERS' COMFORT: The above Coupé top fitted to Mr. Westhead's Spartan 3-seater ("Hermes IV") by the Hendy Aircraft Co. at Shoreham has resulted in a 3 m.p.h. speed increase. The factory specialises in work like this and certainly turns out a very good job.**

# THE ROYAL AERO CLUB OF THE UNITED KINGDOM

## OFFICIAL NOTICES TO MEMBERS

REPORT of the Annual General Meeting of Members of the Club, held at 119, Piccadilly, London, W.1, on Wednesday, March 29, 1933, at 6.30 p.m. Lt. Col. Sir Francis McClean, A.F.C., presided.

**Minutes.**—On the motion of the Chairman the Minutes of the Annual General Meeting of the Members held on March 30, 1932, were taken as read and signed by the Chairman.

**Committee Ballot.**—The result of the ballot for the nine vacancies on the Committee was reported as follows:—A. J. A. Wallace Barr, Com. James Bird, O.B.E., Flt. Lt. C. Clarkson, Lt. Col. M. O. Darby, O.B.E., C. R. Fairey, Lord Gorell, C.B.E., M.C., Capt. A. G. Lamplugh, Lt. Col. Sir Francis McClean, A.F.C., F. Handley Page, C.B.E.

**Election of President and Vice-Presidents.**—On the motion of the Chairman the following were unanimously elected:—President, The Duke of Atholl; Vice-Presidents, The Duke of Sutherland, Lord Wakefield of Hythe.

**Club Rules.**—On the motion of the Chairman, the following addition to Rule 51 of the Club Rules was unanimously confirmed:—"Members elected after the first three months of the year shall pay as a first subscription a proportionate amount for the unexpired period, *i.e.*, three-quarters if elected before July 1, half if elected between July 1 and September 30, quarter if elected between October 1 and November 1."

### Chairman's Remarks

"The reason why I am presiding at this meeting is because the Chairman of the Club, Lord Gorell, is still away in the United States, where he is keeping an engagement which was made prior to his taking over the chairmanship of the Club.

"I now propose to give you a short *résumé* of the activities of the Club on the aviation side. You will later hear from Maj. Petre, the Chairman of the House Committee, a report on the social and club side, and from Mr. Handley Page, Chairman of the Finance Committee, a report on the financial side of our activities.

"As regards aviation, the Club has on many matters had the active co-operation of the Air Ministry, and in return the Air Ministry not infrequently consults the Club, and our General Council of Associated Light Aeroplane Clubs, on questions affecting private flying. In confidence, I think, it should be known that the mutual co-operation between the Ministry and the Club is paid for by one party and free to the other party—to our disadvantage.

**Private Flying.**—"In spite of the world slump and the resulting depression among private finances, private flying has continued to show a steady progress during the year 1932. The Club has issued no less than 616 aviators' certificates. 962 new licences have been taken out, and at the present time there are 2,765 current licences held. The number of current licences shows an increase of nearly 700 over the previous year. There are also 402 privately-owned aircraft in Great Britain.

**Air Touring.**—"The Air Touring Department of the Club is now firmly established. This department is in a position to supply information to air tourists as to air routes, aerodromes and landing grounds, prohibited areas and air corridors and on the formalities which have to be complied with on entering or leaving a foreign country. Where permits are a condition of entry into any country these can be obtained through the Touring Department. During the past year 401 Customs carnets have been issued. This is a slight increase over the previous year, and constitutes by far the largest amount of foreign air touring effected by any country in the world. These carnets are now available for twelve months from the date of issue, and are available for 15 entries into a foreign country. The carnets issued during the year allow for approximately 6,000 journeys by air from this country. This refers only to private air touring. The movement of our commercial air lines is additional to this. The facilities for air touring abroad are receiving the careful consideration of the Committee. There are many formalities and regulations which are hindering the development of air transport, and strong representations have already been made to the various Governments on the question of the special permits being necessary to fly over the territory of certain States. We are also endeavouring to standardise, as far as possible, Customs procedure. Owing to the number of Governments concerned and different class of protection required by the various Customs authorities, negotiations with these Governments are necessarily protracted, but it is hoped that good results will follow the united actions taken by the various foreign clubs forming the F.A.I.

"The representation of the Club on the F.A.I. involves the Club in a large amount of work. This last year we have had to attend conferences abroad on four occasions, and the Club is greatly indebted to Lt. Col. O'Gorman, its Vice-Chairman, who has represented the Club at these conferences. I need not dwell on the essential need for united control of sport or on the advantages of concerted international action in our quest for touring privileges and facilities. Our international activity is of great value to us and our prestige.

**Light Aeroplane Clubs.**—"Our General Council brings together 18 Associated Light Aeroplane Clubs, with a total membership of approximately 7,000 members, and represents the large bulk of the private flying activity of the whole country. This working together has produced benefits both to the Club and the light aeroplane clubs. Concerted action by the General Council was successful in obtaining a renewal of the subsidies for the light aeroplane clubs, and was useful in moderating the vigour with which it was sought to introduce an excess of regulations governing private flying.

**Affiliated Clubs.**—"Apart from the light aeroplane clubs, the following clubs are directly affiliated to the Royal Aero Club:—The Associated Australian Aero Clubs; The Aero Club of India and Burma; The Aero Club of South Africa; The Aero Club of East Africa; The New Zealand Aero Club; The Royal Singapore Flying Club. This affiliation keeps us in the closest touch with the aviation activities in our various Colonies.

**Outstanding Performances.**—"During the year 1932 one more world's record was obtained for British aviation. I refer to the performance of Capt. Cyril Frank Uwins on a Vickers "Vespa" aircraft fitted with a Bristol "Pegasus" engine, who accomplished an altitude of 43,976 ft. (13,404 metres). For this performance the Royal Aero Club awarded the Britannia Trophy for 1932 to Capt. Uwins. Quite recently still another world's record was gained for Great Britain. I refer to the long-distance flight on the Fairey monoplane, fitted with a Napier "Lion" engine, piloted by Sqd. Ldr. Gayford and Flt. Lt. Nicholetts. Never before have the world's records for speed, height and distance resided in one country. There have been many notable flights between this country and our Colonies during the year." Sir Francis here referred to the flights of C. W. A. Scott, J. A. Mollison and Mrs. Mollison, and to the civil aviation meetings held during last year.

**Portraits.**—"You will recollect that we have had two very significant functions this year in connection with the unveiling of the portraits of two eminent members of the Club, who have in their various ways given distinguished service to the aviation movement. Henceforth the Club will keep as precious possessions the portraits of our fairy Godfather Lord Wakefield, by Capt. Oswald Birley, and of our regretted and most energetic supporter, the late Sir Sefton Brancker, by Mr. Edward Newling.

**Committee.**—"You are well aware that the Club, owing to its numerous activities in relation to sport, international work, touring, and in encouraging the development of aviation generally, has an enormous amount of work to do, much of which necessarily escapes the notice of the ordinary member. Our monthly meetings of the Committee become more and more charged with work, some of which requires not only knowledge of a specific nature, but takes up a large amount of the private time of the members between Committees. The extent of these activities is indicated but slightly by the long list of Committee men and Sub-Committee men who voluntarily undertake this work under the guidance of the Club Committee. To these members we owe our thanks."

Maj. H. A. Petre, Chairman of the House Committee, and Mr. F. Handley Page, Chairman of the Finance Committee, briefly reported on the work of their respective Committees during the year.

**Vote of Thanks to the Chairman.**—A vote of thanks to the Chairman, proposed by Maj. Goodfellow and seconded by Mr. C. R. Fairey, was unanimously carried.

**Offices:** THE ROYAL AERO CLUB,
119, PICCADILLY, LONDON, W.1.
**H. E. PERRIN, Secretary.**

# Airport News

## CROYDON

ON Monday evening, April 3, Lord Londonderry arrived by air liner from Paris. He was met at Croydon by Maj. Leslie F. Richard, Chief Officer of the Aerodrome, and one of his private secretaries.

The importation of plovers' eggs by air from Holland commenced at the beginning of the week, and regular supplies have been arriving every day by K.L.M. The sale of plovers' eggs in this country is prohibited; these daily supplies are brought over for most of the fashionable West-End clubs and private individuals of note.

On Thursday, the first strawberries of the season to arrive by air were imported from Holland—they were almost worth their weight in gold. Later in the season they will be arriving by the ton and will be worth little more than the cost of the freightage.

Mr. Randolph Churchill, who has been on a short visit to Berlin, returned to Croydon by D.L.H. on Thursday afternoon.

On Friday, April 7, a monkey which had been purchased from the *Daily Mail* Ideal Home Exhibition at Olympia by the owner of a private zoological park in Switzerland, was despatched by air to his new home.

Mr. H. V. Mueller, the famous German singer, arrived by D.L.H. from Berlin—the object of his visit is to record for one of the gramophone companies.

On Saturday morning, Prince Hubertus, of Prussia, the ex-Kaiser's grandson, and his cousin Duke Friedrich, of Mecklenburg-Schwerin, left Croydon at 9.20 a.m. in the German air liner to return home following their short stay in England. Prince Hubertus left the air liner at Amsterdam; the Duke, however, continued on to Hamburg.

Catherine, Countess of Drogheda, arrived at the aerodrome by car and the Master of Sempill flew from Heston in a "Moth" machine to bid the Prince *bon voyage*.

Sir Philip Cunliffe-Lister, Secretary of State for the Colonies, left by air liner on a visit to Palestine and Cyprus on Saturday.

In the evening Lady Londonderry and her daughter, Lady Mary Stuart, arrived by air liner from Paris.

As the result of a telephone call from Jersey at about 11 o'clock on Saturday night, Surrey Flying Services received an order to send a special aeroplane to Jersey to bring a stretcher case to London. Mr. S. F. Woods left at 7 a.m. on Sunday morning in a "Fox Moth" and landed on the sands at Jersey. The patient was carried down to the beach on the stretcher and carefully placed in the cabin of the machine; he was accompanied by his wife and nurse. They arrived at Croydon at 7 p.m., where a private car, fitted with a special bed, waited to convey the invalid to a private nursing home in London.

Mr. J. C. Kooymans, the Dutch millionaire and cement king, has chartered a special air liner from the K.L.M. in which he intends to make a tour of Europe, calling at the principal towns.

M. Coty, the well-known French millionaire and scent king, has placed an order for a new three-engined Wibault monoplane similar to those which will be used by the Air Union on their summer service, commencing May 1. M. Coty is already the owner of a number of private machines in France. The suggestion that the boom days of flying millionaires are over seems to be a mistaken idea, judging from the above.

The continued fine weather over the week-end again brought many sightseers to the aerodrome, and the pleasure flight firms were kept busy.

An Avro 504K belonging to the South Coast Aviation Co. has been completely overhauled by S.F.S. Two similar machines have been sold to the Devonshire Aviation Tours, of Exeter, by S.F.S., who have also sold their D.H.9 to Mr. Winch, and it is likely that it will be stationed in the neighbourhood of Aylesbury.

The total number of passengers for the week was 1,244; freight, 57 tons 11 cwt.

HORATIUS.

## FROM HESTON

SUNDAY was glorious for flying and both private owners and pupils in the school kept the air dark with machines until the more normal phenomenon of sunset. Dr. Gregory left in his machine for Ostend and returned later in the day; another return flight was that of Mr. Jackaman's "Monospar," which took off at tea time and picked up two passengers at Le Bourget, returning to Heston at 9.25 and landing by his own searchlight. Another feature of the day's arrivals was Mr. Guinness' new "Monospar"; Mr. Westhead's Avro "Cadet" was also in evidence.

On Monday a machine cleared from Jersey with two passengers and on Tuesday a "Moth" came to Heston from Paris, a "Fox Moth" left for Antwerp and Mr. Weedon in an Airwork "Moth" took the Deputy Director of Civil Aviation, Mr. F. G. L. Bertram, C.B.E., to Lympne, Marden, Penshurst and Littlestone on a tour of inspection. A Banco machine took two Press photographers to Boston (Lincs).

On Wednesday, Mr. J. Reginansi took delivery of the first Comper "Swift" to be sold since the Comper works were transferred to Heston from Hooton, and left later for Lympne, *en route* for Australia. Mr. Reginansi has given a series of demonstrations of the Comper "Swift" in Corsica, and has done two long-distance flights, to Saigon and Madagascar respectively, in company with Mr. Bailly. Inward movements included Capt. Styran from Germany.

Thursday was a day with more of the good flying weather with which we have recently been blessed, and apart from a busy day in the school two machines went to Paris and Rotterdam respectively, two arrived from France and the week-end crescendo of private flying was again to be seen and heard, besides a number of private owners from outside Heston dropping in for a drink or a meal or a yarn—or all three.

Capt. Styran left for Paris on Friday with one passenger and a private owner went to Brussels; Maj. Shaw again was seen in his "Cadet," and Capt. Lancaster left for Lympne on his way for the record dash to the Cape in G-ABLK.

On Saturday there was a visit on a large scale paid by the Hospitals Pageant machines, who were performing later in the day at Hayes nearby. Dr. Gregory went to Flushing and returned, and a Banco machine left for Paris. There was a very large crowd at the aerodrome all day and 66 machines paid a call at one time or another.

In the late afternoon Heston was treated to a display of the capabilities of the Avro "Cadet," particularly for trick landings at low speeds. A Banco machine brought a passenger from Halton to catch the Imperial Airways connection at Croydon, and the Hon. Mrs. Victor Bruce paid a visit in her Fairey "Fox" from the Hospital Pageant field.

The Airwork school was consistently busy during the whole of the week and six new pupils joined the list of enthusiasts.

## Air Port for Iraq

ON Thursday, April 6, King Feisal, in the presence of Sir Francis Humphrys, the British Ambassador, inaugurated Iraq's new airport. It is about a square mile in area and possesses most up-to-date equipment, including night landing apparatus. In the future it is likely to be an important station when air lines to Australia and India become more international.

# REVIVAL OF PYLON RACING

IT has been decided to revive "Pylon Racing" in England. A company has been formed with considerable capital, and prize money amounting to £5,000 has been guaranteed. No such racing has been seen in England for some time, though it is a regular feature at flying meetings in America, attracts large crowds, and, if American claims be correct, gives a very healthy impetus to flying in general, and improvement in design and construction in particular. The races will, of course, be international and the organisers are convinced that adequate support will come from the Continent and from our air-minded friends across the Atlantic. It will be interesting to see if the Americans can substantiate their claim of possessing the fastest land planes in the world by carrying off the prizes!

The first of these meetings is to be held at the Portsmouth Municipal aerodrome on Friday, Saturday and Monday, August 4, 5 and 7, subject to a formal agreement. To avoid handicapping complications, machines will be divided into three classes:—"A" Class, unlimited, with a speed of at least 170 m.p.h.; "B" Class, up to 8½ litres engine capacity, speed not less than 160 m.p.h.; and "C" Class, up to 6½ litres engine capacity, with speed of at least 150 m.p.h. The course will be circular, and about 10 miles in length. Machines will probably fly at heights well under 1,000 ft. Regulations will allow for an increase of speed by any means, such as supercharging, special fuels, special streamlining, retractable undercarriages, variable pitch propellers, or other methods, providing that each engine and aeroplane is passed by the Air Ministry of the country in which the machine is produced, and approved by our own authorities. The course for the heats will probably be about 50 miles, and for the finals about 100 miles.

Any project which is likely to assist the aircraft industry in this country to improve design and construction is well worthy of support. But a great deal of care will have to be taken in laying out the course and in placing the public stands. It has been stated that there is a lack of machines in the country built with speed as the primary object. Perhaps, but most of, if not all, our aircraft manufacturers are well capable of building such machines, and would be only too willing to do so, provided there was a reasonable prospect of sales.

# WORLD FLIGHTS IN SEASON

IT would seem that "now is the time when a pilot's fancy lightly turns to thoughts of World Flights." At the present moment several long-distance flights are in varying stages of progress.

On April 1 the French airwoman, Mlle. Maryse Hilz, set out from Le Bourget for Tokio. She was flying a Farman 290 monoplane *Joe-II* (Gnome and Rhône "Titan"), accompanied (according to French reports) by a mechanic, M. Lemaire. On April 4 she had reached Karachi and next day she flew non-stop to Calcutta. On April 6 she set out for Bangkok, but no further news was received until the following night, when it was reported that she had landed that morning at Hanoi, having halted en route at a small town in Indo-China. Incidentally, an hour after her arrival at Hanoi, Señor Loring, the Spanish airman, who had left Madrid for Manila on March 18, also landed there. Mlle. Hilz accomplished the journey to Hanoi in the record time of about 5 days 20 hours; she used Castrol oil and K.L.G. plugs.

An Italian effort started on April 8, when Dr. L. Robbiano (who is a captain of the Italian Air Force Reserve) left Lympne aerodrome at 7.18 a.m. on his second attempt to beat Mr. C. W. A. Scott's record of 8 days 20 hr. 47 min. for a flight from England to Australia. He was flying his Breda 33 monoplane ("Gipsy III"), which carried 120 galls. of petrol and 80 lbs. of luggage. Making only a brief stop at Vercelli, he reached Bari (1,200 miles) that evening, and next day he accomplished a 9 hours' flight to Aleppo. He left again for Jask two hours later, but at the time of writing no news of his arrival has been received.

Another flight to Australia started on April 9 when Miss Jean Batten left Lympne in a D.H. "Gipsy Moth," originally owned by H.R.H. the Prince of Wales, with the object, not of beating the record for the trip, but of returning to her home in New Zealand, where she hopes to take up air taxi work. Miss Batten reached Naples in the evening, and next day flew to Athens. She left for Aleppo early on April 11.

Other flights in progress are:—Capt. W. N. Lancaster, who left Lympne in Sir Charles Kingsford Smith's Avro "Avian," *Southern Cross Minor*, on April 11, on an attempt to beat Mrs. J. A. Mollison's record flight to the Cape; Capt. Hans Bertram, who is returning to Berlin from Java in his Junkers monoplane; Mrs. Harry Bonney (a cousin of the late Sqd. Ldr. Bert Hinkler), who started from Brisbane on April 10 for Port Darwin en route for England to beat the "Amy Johnson" record for that trip; and Fraulein Beinhorn, who is engaged in a flight from Berlin to the Cape. This plucky young German pilot, by the way, was recently presented with a silver loving cup by President von Hindenburg, accorded to her as the best German flying achievement, for her flight to India and Australia and across the South American continent. She made the flight in a Klemm monoplane equipped with a 100-h.p. Argus engine.

## The Airship Disasters

As briefly recorded last week, the United States naval airship *Akron* was lost off the New Jersey coast during the early morning of April 4 in a thunderstorm. Out of the 76 on board, but four were rescued by the German tanker *Phœbus*, and one of the four died in hospital after being brought ashore. Among those saved was Lt. Com. Wiley, from whose report it appears that the airship was forced down on the water by strong down-currents, and having been made partly unmanageable by the breaking of some of the control surfaces. That structural breakage occurred seems established, but it appears uncertain at the moment whether the breakage happened while the airship was still at some height, or whether it was caused at the moment she struck the water. One thing appears certain: there was no fire. The *Akron* was, of course, filled with helium and not with hydrogen, but carried petrol fuel, so that a fire *would* have been possible. Among the aircraft which went out to search for survivors was the little "Blimp" airship *J.3*. On her return she is reported to have struck some high-tension wires and to have crashed, two of her crew being killed. Messages of sympathy have been sent by His Majesty the King to President Roosevelt and by the Air Minister, Lord Londonderry, to the Secretary of the Navy Department, Washington. April 4 was an unfortunate day for airships. On the same day as the American disasters, the small French airship *E.9* was destroyed during a test flight, fortunately without injury to her crew. The Naval Court of Inquiry into the destruction of the *Akron* began work at Lakehurst on April 10. Rear-Admiral Henry Butler took the place of Rear-Admiral W. W. Phelps as President of the Court owing to the latter's withdrawal on account of illness. The body of Rear-Admiral Moffett, Chief of the Naval Bureau of Aeronautics, who was a passenger in the *Akron* at the time of the crash, was recovered from the sea on April 10. The body of Commander McCord, who was in command of the airship, has also been recovered.

## The A.A. Register of Landing Grounds

THOSE in possession of that very valuable "Register of Aircraft Landing Grounds," which is compiled by the aviation department of the Automobile Association, may now obtain an index sheet which has specially been designed for use in conjunction with the A.A. Handbook. One column in this index is a reference to the maps found at the end of the Handbook. The reference numbers of the landing grounds are so arranged in numerical order that it is a simple matter to find that which is nearest to any place marked on the map.

# SOME NOTES ON SILENCING LIGHT AEROPLANES

*By Sir John V. Carden, Bart.*

THREE years ago I had my first aeroplane flight and I determined to register my impressions carefully—in what way did this new form of transport fall short of the motor car?

The outstandingly disagreeable part of this flight to me was the appalling noise ; though I had been supplied with a helmet, the noise was deafening, and in addition one experienced a battering sensation which was far from restful. When the engine was finally shut down for the glide to land one experienced a great feeling of relief, everything was calm and delightful even though the machine was still travelling at considerable speed. If then this same condition could be reproduced when flying under power flying would become irresistibly attractive.

The following notes built up from my experiences and deductions in an investigation into this matter of noise are given for what they are worth:—

My first step was to buy the usual " Gipsy I Moth " which, after innumerable hours, I ultimately learnt to fly. I then started to make inquiries as to what had been done in the past to secure greater silence ; opinion was that the propeller was the main cause, that nothing could be done about it, and that as this noise was far greater than any other noise it was a waste of money trying to stop it.

This is definitely not the case on light aircraft, though it may be on larger machines. Modifications subsequently made proved that to the occupants the exhaust is the worst cause of noise, the propeller comes second and mechanical noises from the engine third. To an observer on the ground the exhaust is far the worst offender, the propeller comes a bad second and mechanical noises are practically inaudible.

Tests on the exhaust system showed that if the outlet was moved to different points on the machine a great difference in the volume of noise heard by the occupants resulted.

An outlet near to the propeller and under the nose of the machine was far better than the conventional position which is at the side and well to the rear. It is thought that this is due to the insulating effect of the body and wings which in the forward arrangement lie between the occupants and the exhaust outlet. This modification did not help from the point of view of the ground observer, and it was therefore decided to fit a silencer.

Here, again, popular opinion is at fault, one is told that to fit a silencer will cause baffling and overheating, which cannot be tolerated on an air-cooled engine, and that a serious drop in horse-power will result. This is not so with the right silencer.

The Burgess silencer was ultimately selected, as this has a perfectly clear straight through opening which cannot possibly cause baffling, all the noise is absorbed by the sound-absorbing qualities of the walls of the box without interfering with the flow of the gases in any way. This silencer very effectively quietens a four-cylinder engine, and on my present seven-cylinder " Pobjoy " engined Klemm silences the exhaust completely.

The next point to be tackled was the propeller. With the exhaust silenced this became much more evident, and it was possible to form some idea of where the noise came from. I reached the conclusion that a great deal of what was called propeller noise was really the slip stream buffeting against the struts and wires that lie behind it.

If the machine is allowed to glide at a speed equal to the slip stream of the propeller, the air passing these obstructions makes a considerable noise, and it seemed likely that this noise might be materially increased by the pulsating action of a two-bladed propeller. Nothing could be done to prove this theory on the " Moth," so I disposed of it and purchased a Klemm. This machine is very clean and free from obstructions, and, in addition, the propeller is placed a long way ahead, so that the action of the individual blades has time to even out somewhat.

In addition, a large low-speed propeller can be used, as the " Pobjoy " engine is fitted with a reduction gearing. This combination shows a big reduction in propeller noise.

Since then, I have, on advice from the propeller manufacturers, changed from a two- to a four-bladed propeller, which has only very slightly reduced the performance of the machine; with this arrangement the noise from the propeller is negligible. So quiet is the machine that it can be comfortably flown without a helmet, and the noise of individual tappets can be distinctly heard. The machine is, of course, an open one.

Heard from the ground, it is considered that the noise is no more than that of a car passing at the same speed and distance from the observer.

Some further improvement could, I think, be made if a pusher propeller or propellers could be used. With this plan the solid column of air forming the slipstream need have nothing to impinge on and it seems likely that the incoming air converges on the propeller at a comparatively low velocity. Its passage past any forward part of the machine need not therefore be noisy.

The only remaining noises are the mechanical ones which, with the co-operation of the engine makers, I feel sure can be reduced to a degree at which they are not objectionable.

The reduction gear is the worst offender but one which must be faced if we are to keep to small light engines in which piston, exhaust and tappet noises are easy to handle.

I have not yet reached that happy state where I feel safe in a closed machine, but I feel sure that in this type there are wonderful possibilities for insulation against noise if the mass of information which is now available on this subject was properly applied. Certain firms have specialised on this work in connection with the building trade, and much of the material used is very light and quite applicable to aircraft.

In conclusion, I feel sure that the time when really quiet aircraft should be insisted on has come—due to noisy demonstration machines many prospective owners are discouraged from purchasing, and, even worse, the general public in the vicinity of aerodromes are becoming so maddened with the continual noise that to them aviation is becoming really unpopular.

The factors which will produce the right result are:—

(1) Compulsory fitting of efficient silencers.
(2) Clean design, particularly in the immediate rear of the propeller.
(3) Slow speed multi-blade propellers placed well clear of other parts.
(4) Small engines fitted with silent reduction gears.
(5) Well insulated cabins.

**A " Ghost " view of the silencer referred to above by Sir John Carden.**

# THE ROYAL AIR FORCE

*London Gazette*, April 4, 1933.

*General Duties Branch*

The following are granted short service commns. as Pilot Officers, with effect from and with seny. of Feb. 21 :—J. F. Hobler, H. G. Lee, W. W. E. Oliver, E. J. Palmer. The following are granted short service commns. as Acting Pilot Officers on probation with effect from and with seny. of March 24 : J. S. Bartlett, E. H. P. Clarke, D. G. S. Cotter, P. H. Dutton, N. D. Gilbart-Smith, J. R. Gillman, R. M. Hall, W. T. King, W. E. Legard, F. M. Loudon, D. F. Macdonald, H. J. Maguire, A. C. Meeson, S. T. Misselbrook, H. W. A. Oloff de Wet, C. F. Newcombe, J. A. K. Pettit, D. G. A. Rearden, F. C. Scott, G. P. Seymour Price, C. R. Taylor, H. West.

The following Pilot Officers on probation are confirmed in rank :—G. R. Murphy (Dec. 28, 1932) ; W. L. Stedman (March 11). The following Pilot Officers are promoted to rank of Flying Officer :—C. W. M. Ling (Jan. 25) ; H. D. Gilman (March 26).

The following are promoted with effect from April 1 :—

*Flight Lieuts. to be Squadron Leaders* :—C. W. Attwood, F. R. Wynne, M.B.E., A. C. Stevens, C. G. Wigglesworth, A.F.C., A. H. Flower, H. J. Collins, C. F. Chinery, J. A. Boret, M.C., A.F.C., T. A. Warne-Browne, D.S.C., C. W. Busk, M.C., A.F.C., H. H. Down, A.F.C.

*Flying Officers to be Flight Lieuts.*—A. R. Combe, L. M. Woolveridge, P. W. M. Wright, F. R. Worthington, C. C. O'Grady, R. A. T. Stowell, R. W. K. Stevens, J. F. X. McKenna, R. C. Hancock, S. O. Bufton, S. R. Ubee, D. Menzies, F. D. Biggs, A. R. Sarel, D. J. Waghorn, G. H. H. Proctor, R. C. Feild, J. R. H. Pott, W. K. Beisiegel, J. H. T. Simpson, J. B. Fyfe, D. Dickson, E. J. H. F. Moreton, E. L. Mole.

F./O. F. L. P. Henzell is placed on half-pay list, Scale B, from Dec. 1, 1932 to March 18 inclusive. (Substituted for *Gazette*, Dec. 6, 1932) ; Flt. Lt. E. H. Rundle is placed on retired list at his own request (April 3) ; Sqdn. Ldr. P. L. Plant is placed on retired list at his own request (April 4) ; F./O. L. M. Middleton is placed on retired list on account of ill-health (April 5). The following Flight Lts. are placed on retired list (March 30) :—E. R. Hockaday, J. Rodger, D.S.M.

Flying Officer H. P. Wilson is transferred to Reserve, Class A (April 2).

*Stores Branch*

The following are promoted with effect from April 1 :—

*Flying Officers to be Flight Lieuts.*—T. I. Iliff, P. P. S. Rickard, E. G. M. Charleson.

Flight Lt. F. C. Griffin is placed on retired list (April 5).

### PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Sister Miss M. E. Grieveson is placed on retired list on account of ill-health (March 31).

### ROYAL AIR FORCE RESERVE
### RESERVE OF AIR FORCE OFFICERS

*General Duties Branch*

The following are granted commns. as Pilot Officers on probation in Class AA (ii) (March 20) :—K. M. G. Anderson, D. W. F. Barker, R. D. Baughan, J. C. Boulter, B. S. Braithwaite, W. G. M. B. Broomhall, J. C. W. Buxton, R. F. Carnegie, A. B. Corfe, F. A. Currey, J. G. Davis, F. E. R. Ducker, J. W. Franklin, J. D. Gardiner, K. V. Garside, A. H. McM. Hely, W. H. A. Hibberd, N. M. E. Highton, G. B. M. Knox, G. A. P. Manwaring, J. A. Mertens, G. K. Murray, B. M. Pimm, G. F. Powell, P. B. Powell, J. C. Reynolds, C. F. H. Shepherd, J. C. Smyth, A. T. Stockings, E. Rosslyn-Stuart.

The following Flying Officers are transferred from Class C to Class A :—J. F. Nicholas (Jan 14) ; L. S. Hill (March 26).

Pilot Officer I. R. Parker is transferred from Class AA (i) to Class C (Oct. 9, 1932). The following Flying Officers relinquish their commns. on completion of service and are permitted to retain their rank :—C. K. Carter (March 25) ; L. A. Walters (Nov. 11, 1932).

### AUXILIARY AIR FORCE

*General Duties Branch*

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—A. M. Grant is granted a commn. as Pilot Officer (March 12).

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified :—

*General Duties Branch*

*Group Captain* C. H. B. Blount, O.B.E., M.C., to School of Army Co-operation, Old Sarum, 3.4.33, to Command.

*Squadron Leader* C. E. Maitland, D.F.C., A.F.C., to No. 22 (P) Sqdn., Martlesham Heath, 20.3.33, to Command *vice* S./Ldr. E. S. Goodwin, A.F.C.

*Flight Lieutenants* : R. M. Davy, to H.Q., Coastal Area, Lee-on-Solent, 23.3.33. W. M. M. Hurley, to Station H.Q., Donibristle, 27.3.33. J. D. A. Keary, to Air Ministry Dept. of Air Member for Personnel (D. of P.) 1.4.33. C. W. Busk, M.C., A.F.C., to No. 2 Armament Training Camp, North Coates Fitties, 2.3.33. L. de V. Chisman, to No. 1 Armament Training Camp, Catfoss, 1.3.33. R. W. M. Clark, to No. 3 Armament Training Camp, Sutton Bridge, 20.3.33. M. C. Dick, A.F.C., to No. 3 Armament Training Camp, Sutton Bridge, 1.3.33. P. de C. Festing Smith, to No. 70 (B.T.) Sqdn., Hinaidi, Iraq, 1.4.33. H. J. Genmel, to No. 55 (B) Sqdn., Hinaidi, Iraq, 1.4.33. N. C. Ogilvie-Forbes, to No. 13 (A.C.) Sqdn., Netheravon, 1.4.33. R. N. Waite, to R.A.F. Base, Calshot, 23.3.33.

*Flying Officers* : W. R. Baird, to Air Armament School, Eastchurch, 27.3.33. R. W. H. Harrison, to Coast Defence Co-operation Flight, Eastchurch, 25.3.33. G. P. Longfield, to Administrative Wing, R.A.F., Halton, 31.3.33. J. E. Loverseed, to N. 14 (B) Sqdn., Amman, Palestine, 15.3.33. C. E. St. J. Beamish, to No. 2 Armament Training Camp, North Coates Fitties, 3.3.33. C. M. Champion de Crespigny, to No. 1 Armament Training Camp, Catfoss, 3.3.33. L. R. S. Freestone, to No. 2 Armament Training Camp, North Coates Fitties, 3.3.33. P. H. Heygate, to R.A.F. Base, Gosport, 31.3.33. E. C. Hudleston, to No. 1 Armament Training Camp, Catfoss, 3.3.33. M. T. M. Hyland, to No. 3 Armament Training Camp, Sutton Bridge, 24.3.33. J. C. Macdonald, to No. 1 Armament Training Camp, Catfoss, 20.3.33. G. P. Marvin, to No. 2 Armament Training Camp, North Coates Fitties, 24.3.33. A. W. S. Matheson, to No. 1 Armament Training Camp, Catfoss, 20.3.33. P. H. Maxwell, to No. 2 Armament Training Camp, North Coates Fitties, 20.3.33. R. M. Messiter, to No. 3 Armament Training Camp, Sutton Bridge, 25.3.33.

*Pilot Officers* : M. C. Moore, to No. 216 (B.T.) Sqdn., Heliopolis, Egypt. 14.3.33. W. W. E. Oliver, to No. 10 (B) Sqdn., Boscombe Down, 30.3.33. E. J. Palmer, to No. 9 (B) Sqdn., Boscombe Down, 30.3.33. P. Y. Davoud, to No. 5 Flying Training Sch., Sealand, 17.3.33. D. Price, to No. 5 Flying Training Sch., Sealand, 17.3.33. G. E. Watt, to No. 5 Flying Training Sch., Sealand, 17.3.33.

*Acting Pilot Officers* : The undermentioned Acting Pilot Officers are posted to R.A.F. Depot, Uxbridge, on 24.3.33, on appointment to Short Service Commns. :—J. S. Bartlett, E. H. P. Clarke, G. D. S. Cotter, P. H. Dutton, N. D. Gilbart-Smith, J. R. Gillman, R. M. Hall, W. T. King, W. E. Legard, F. M. Louden, D. F. Macdonald, H. J. Maguire, A. C. Meeson, S. T. Misselbrook, C. F. Newcombe, H. W. A. Oloff de Wet, J. A. K. Pettit, D. G. A. Rearden, F. C. Scott, G. P. Seymour Price, C. R. Taylor, H. West.

*Stores Branch*

*Flight Lieutenants* : W. F. Langdon, to No. 30 (B) Sqdn., Mosul, Iraq, 15.3.33. R. W. Stewart, to Station H.Q., Boscombe Down, 1.4.33. R. M. Thomas, to No. 47 (B) Sqdn., Khartoum, 13.3.33.

*Accountant Branch*

*Squadron Leader* W. G. W. Prall, to Station H.Q., Upper Heyford, 1.4.33.
*Flight Lieutenant* D. F. A. Clarke, to Station H.Q., Hendon, 1.4.33.

### NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty :—

*Lieut.-Commdr.* R. R. Graham (Flight Lieut., R.A.F.), to *Victory*, for R.A.F. Base, Gosport, and for course (April 3), and to *Eagle* for 405 Flight in command.

*Lieutenants* : (*F./O., R.A.F.*).—A. C. R. Duvall, to *Victory*, for courses (April 3), and to *Exeter* for 407 Flight (April 17). G. D. Anderson, to *Victory*, for R.A.F. Base, Gosport, for courses (April 4), and to *Eagle* for 405 Flight (on embarkation).

S S S S S S

**Reorganisation of the Fleet Air Arm**

The Air Ministry announces :—

The following changes will take effect from April 3, 1933 (or as soon after as may be conveniently arranged between the various naval and air force commands concerned).

2. Organisation by squadrons of 12 or 9 aircraft will be introduced in respect of units of the Fleet Air Arm allotted for embarkation in aircraft carriers. The reorganisation will be carried out as follows :—

*Fighter flights.*

Nos. 402 and 404 become No. 800 Squadron (12 aircraft), H.M.S. *Courageous*.
No. 401 (9 aircraft) becomes No. 801 Squadron (9 aircraft), H.M.S. *Furious*.
Nos. 408 and 409 become No. 802 Squadron (12 aircraft), H.M. *Glorious*.
*No. 405 (9 aircraft) becomes No. 803 Squadron (9 aircraft), H.M.S. *Eagle*.

*Spotter reconnaissance flights.*

No. 446 and †one-half of No. 445 become No. 821 Squadron (9 aircraft), H.M.S. *Courageous*.
No. 450 and †one-half of No. 445 become No. 820 Squadron (9 aircraft), H.M.S. *Courageous*.
Nos. 442 and 449 become No. 822 Squadron (12 aircraft), H.M.S. *Furious*.
Nos. 441 and 448 become No. 823 Squadron (12 aircraft), H.M.S. *Glorious*.
Nos. 440‡ and 460* become No. 824 Squadron (12 aircraft), H.M.S. *Eagle*.

*Torpedo/bomber flights.*

Nos. 463 and 464 become No. 810 Squadron (12 aircraft), H.M.S. *Courageous*.
Nos. 465 and 466 become No. 811 Squadron (12 aircraft), H.M.S. *Furious*.
Nos. 461 and 462 become No. 812 Squadron (12 aircraft), H.M.S. *Glorious*.

3. Organisation by squadrons will not be introduced for units providing aircraft for operation from cruisers or capital ships. These units will be allotted as follows :—

No. 403 Flight—5 aircraft—5th Cruiser Squadron : China Station.
,, 406 ,, —2 aircraft—East Indies.
,, 407 ,, —5 aircraft—2nd Cruiser Squadron : Atlantic Fleet.
,, 443 ,, —5 aircraft (*a*)—West Indies and South Africa.
,, 444 ,, —4 aircraft (*b*)—Home Fleet Capital Ships.
,, 447 ,, —6 aircraft—1st Cruiser Squadron, Mediterranean, and Mediterranean Fleet Capital Ships.

(*a*) Reduced from 6 aircraft.
(*b*) Increased from 3 aircraft.

4. Establishments of personnel revised to conform to the new organisation will be issued in due course.

* Will proceed to China in H.M.S. *Eagle* on relief of H.M.S. *Hermes*.
† *i.e.*, 3 aircraft.
‡ Embarked in H.M.S. *Hermes*, pending relief by H.M.S. *Eagle*.

S S S S S


## The Air Force List

THE April issue of the Air Force List has now been published. It can be purchased (price 2s. 6d.) from H.M. Stationery Office at the following addresses :—Adastral House, Kingsway, London, W.C.2 ; 120, George Street, Edinburgh ; 2, York Street, Manchester ; 1, St. Andrew's Crescent, Cardiff ; 15, Donegall Square, Belfast ; or through any bookseller.

# The Industry

## "A PROSPERITY DIVIDEND"

LORD WARGRAVE, Chairman of Rolls-Royce, Ltd., presiding last week at the company's 26th annual general meeting, in recommending on behalf of the directors a dividend at the rate of 8 per cent. per annum and a cash bonus of 2 per cent., said: "This I am entitled to call a prosperity dividend in times of general commercial depression, which reflects great credit on all engaged in this business." After referring to the adverse effect of the unfavourable trading conditions prevailing in 1931 on their car sales, Lord Wargrave reminded the shareholders that last year he informed them that, thanks to the genius of Sir Henry Royce and his assistants, their aero engines were rapidly securing the same world-wide supremacy as their cars. At the International Air Meeting at Zurich in July last, at which the leading European nations competed, the two principal competitions were won by British aeroplanes both fitted with Rolls-Royce "Kestrel" engines. Shareholders had the satisfaction of knowing that both the air and land speed records were held by Britain and had been achieved by machines fitted with Rolls-Royce aero engines. It was only a few weeks ago that Sir Malcolm Campbell increased his world's land speed record to 272 m.p.h. with his *Bluebird* car fitted with a Rolls-Royce Schneider-type engine, thus supplementing the previous record of 407.5 m.p.h. obtained in the air in 1931. The shareholders would, he thought, agree that for their engines to be associated with two such valuable records was a magnificent performance.

## CELL TO KEEP WATER COOL

TO cool the water used to dissipate the heat from the cylinder walls of aeroplane engines a radiator is used. It's a simple looking thing, just a bundle of tubes round which the water circulates and through which the air flows, but there's really a great deal of work in every one and a large proportion of it is skilled work, so it can never be a cheap piece of apparatus, however much we hope.

Let's follow the process through the works in the sequence followed at Serck, the well-known radiator works at Great Birmingham.

First billets of metal, brass for radiator work, but copper, aluminium and all other non-ferrous metals are used for other purposes, are cast to a suitable size for the extrusion presses. These are then trimmed up, pierced, and heated, down comes the ram of the 1,000-ton press on them and out shoots a long length of tube to the floor below—it's fascinating to watch. These tubes next have to be annealed and passed cold through a series of draw bench, where the dies eventually reduce them to the required size and gauge.

For aircraft radiators tubes of hexagonal section are used, and the last pass is through a roller die which flattens the sides to this shape. At this stage the tubes are in long lengths, and they are next cut into short lengths according to the radiator they are to be used for. Both ends are then bulged out—sometimes one or two places in the middle as well—so that when the flat sides of the tubes come together in forming the honeycomb radiator block, they are kept apart to the extent of the bulge, and it is this space in which the water circulates.

Every single length of tube is carefully tested for leaks before being allowed to go further, and in the company of other perfect tubes it eventually finds its way to the block making shop.

Here the requisite number of tubes is assembled into a wooden jig frame and the embryo radiator begins to take a definite shape. The next step is to dip the ends of the tubes in a solder bath, so that not only are they soldered together, but also so that the water which will have to circulate between them cannot come out at the ends.

From our point of view the most interesting part is now finished, and what remains to be done can be explained in a few words. In the shops, however, it is a different story, because aircraft radiators are not ordered in sufficient quantities as yet, to warrant the extensive use of jigs, so a very great deal has to be hand work to drawings.

The shell has to be put round the block. This is of sheet brass and, of course, has to be soldered everywhere so as to ensure its watertightness, and then the fittings, like inlets, outlets and supporting lugs, are riveted and soldered on.

Throughout the whole manufacture, of course, careful tests are made, and these are far more severe than working conditions, so that nowadays trouble with radiators is a very uncommon occurrence.

In the case of motor-car radiators, which also come from this factory at some hundreds per day, an attractive polished shell covering is required—women wouldn't buy motor-cars if they didn't have it—and these covers are also stamped and plated out in the works, but in aircraft we can afford the weight for such pretty-pretties, so after the finished shell and block is finally tested it is painted and packed ready for despatch to the engine makers.

There are many different shapes of radiators, and every aircraft designer tries to get one which will tuck away into the fuselage so as to cause as little drag as possible. The latest development is to use the wing surfaces as radiators, and this causes no drag with its consequent decrease in performance of the aircraft at all, while the Schneider Trophy S.6 seaplanes used the upper surface of the floats as well!

For ordinary work, however, it does not seem probable that the conventional type of radiator will be discarded for a very long time.

* * * *

## Indoor Flying

THE successful indoor flying (models) meetings, inaugurated a year or so ago by the T.M.A.C. are again in full swing. These take place at the Horticultural (Old) Hall, whenever this is available, generally on Thursday evenings, from 7 p.m. to 9 p.m. On the occasion of our visit on March 30 last we saw some exceptional flying by many excellent models—some of which were realistic scale models of well-known aircraft. Those who have not yet seen these small models taking off from the floor and circling the Hall, looping, etc., and often making beautiful landings just like the real thing, should endeavour to pay a visit to one of the meetings. Mr. A. E. Jones, 48, Narcissus Road, West Hampstead, N.W.6, will gladly supply the necessary information as to when these meetings take place. The humorous antics of a very, very tiny super light plane at one of these meetings is depicted in the accompanying sketch, together with the following legend—*Mosquito (left stranded from last Flower Show)*: "Brother, can you spare a dime?"

* * * *

## PUBLICATIONS RECEIVED

*Hot Air in Cold Blood.* By Brig.-Gen. Guy Livingston, C.M.G. London: Selwyn & Blount, Ltd. Price 18s.

*U.S. National Advisory Committee for Aeronautics Reports:* No. 447. *Static Thrust of Airplane Propellers.* By W. S. Diehl. Price 5 cents. No. 450. *The Calculation of Take-Off Run.* By W. S. Diehl. Price 5 cents. No. 451. *The Drag of Two Streamline Bodies as Affected by Protuberances and Appendages.* By I. H. Abbott. Price 5 cents. No. 453. *The Estimation of Maximum Load Capacity of Seaplanes and Flying Boats.* By W. S. Diehl. Price 5 cents. Superintendent of Documents, Washington, D.C., U.S.A.

*Air Force Law in a Nutshell.* By Capt. P. I. V. Rippon. Gieves Ltd., 2, The Hard, Portsmouth. Price 3s. 6d.

* * * *

## NEW COMPANIES REGISTERED

BLACKPOOL AND WEST COAST AIR SERVICES, LTD. Registered office: Squires Gate Aerodrome, Blackpool. Capital: £10,000 in £1 shares. Acquiring a lease of Squires Gate Aerodrome, Blackpool, to acquire and equip any lands suitable for aerodromes, landing grounds, air parks, and flying clubs, etc. Directors: Richard Barker, 56, Cliff Road, Wallasey, Ches. John C. Higgins, The Haven, Ferry Foad, Eastham, Ches.

* * * *

## AERONAUTICAL PATENT SPECIFICATIONS

*Abbreviations:* Cyl. = cylinder; i.c. = internal combustion; m. = motor. (The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

### APPLIED FOR IN 1931

*Published April 13, 1933*

26,211. PRATT AND WHITNEY AIRCRAFT CO. Thermostatic control of i.c. engines. (389,526.)

26,212. PRATT AND WHITNEY AIRCRAFT CO. Thermostatic control of i.c. engines. (389,527.)

FLIGHT, APRIL 20, 1933. REG. AT THE G.P.O. AS A NEWSPAPER.

FIRST AERO WEEKLY IN THE WORLD

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# FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

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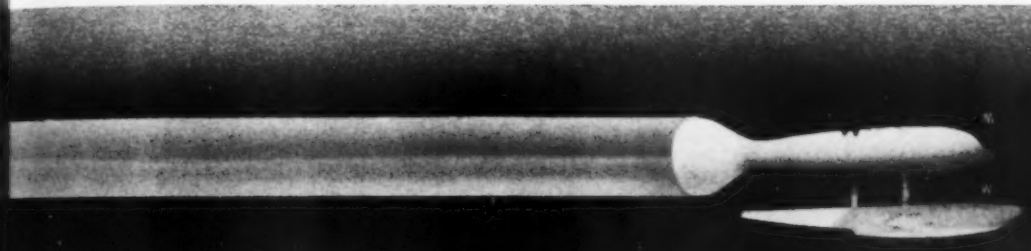
SIXPENCE
EVERY THURSDAY



423
M·P·H
FASTEST SPEED EVER!
USING
WAKEFIELD
Castrol
MOTOR OIL

The World's Air Speed Record was broken on April 10th *(subject to official confirmation)* at Lake Garda, by a Macchi-Castoldi 72 Seaplane piloted by Warrant Officer Francesco Agello. The Fiat engine was lubricated with Castrol, as chosen by Sir Malcolm Campbell for his Rolls-Royce engine in breaking the Land Speed Record at 272 m.p.h.

C. C. Wakefield & Co. Ltd. (ALL BRITISH) Wakefield House, Cheapside, London E.C.2